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THE PRACTITIONER:

A JOURNAL
OF
THERAPEUTICS AND PUBLIC HEALTH.

EDITED BY

T. LAUDER BRUNTON, M.D., F.R.S.,
Fellow of the Royal College of Physicians;
Assistant Physician and Lecturer on Materia Medica and Therapeutics at
St. Bartholomew's Hospital,

AND

DONALD MACALISTER, M.A., M.B., B.Sc.,
Member of the Royal College of Physicians;
Fellow and Medical Lecturer, St. John's College, Cambridge; and Teacher of
Medicine in the University.

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JULY, 1882.

Original Communications.

OBSERVATIONS ON DYSENTERY.

BY J. DICKSON HUNTER, M.D. EDIN., &c.

Arequipa, Peru.

My much esteemed master, Prof. Syme, used to say that there were two classes of disease which are more interesting than others—1st, those which are extremely common; 2nd, those which are extremely uncommon. He advised his students, in their own interest, and in that of their patients, to give more attention to the first class, as being by far the more important of the two. Dysentery may fall under either category. By those who practise abroad it will be placed under the first class. Witness the statistics given by Sir J. Fayrer in his recent work on tropical diseases, and the many deaths from dysentery in the last war in South Africa, and in fact in any war, especially if situated in some warm climate. By home-practitioners it will be placed under the second class. During my three years or more attendance as a student at the Edinburgh Royal Infirmary, I do not recollect having seen a single case of simple acute dysentery, though Prof. Bennett in his *Practice of Medicine* mentions a few cases.

It is not my intention to enter into the subject systematically, but merely to offer some observations made during a long battling with the disease. Where I practise (Arequipa) the disease is always more or less present. I cannot say that I have been able to fix upon any season in particular in which it is most frequent, but this most probably is owing to the very slight difference between one season and another in that locality.

The etiology of dysentery is still far from settled. The following unintentional experiment shows that sometimes it is caused by the water, or rather that water is the medium of communication. About ten years ago some 250 workmen (with their families) were in cottages outside the town, constructing a railway. Their nearest water-supply was from an irrigation canal, which passed through part of the town, and was therefore certainly polluted. Many of these people recognised the probability of the pollution, and used to have their water-supply taken in about 3 a.m., thinking that at that hour, as the water has a good current, it would be pure. While these arrangements lasted, many of these people suffered severely from dysentery. After some months of this experience, an unimpeachably pure spring water was supplied by pipes. Immediately there was a marked diminution, but not a total disappearance of the disease. This further seems to show that the water is not the only cause of the disease. The people of the country regard the water with suspicion, which accounts for many of them using only "chicha" as a drink. It is a weak fermented liquor made from malted maize.

In connection with the subject of water being a carrier of disease germs, amply proved in the case of some diseases, I may mention another observation made in connection with the workmen on this same railway. Many were living in a village on the sea-coast. This village is perfectly healthy so far as intermittent fever is concerned. The ground is hilly without vegetation ; in fact there is no water, so it had to be brought in tanks from some nine miles farther up the line. There, water is to be found in a marshy flat district, and there ague is common. While using water from this source, several of the workmen and their wives were seized with intermittent fever, though they had never left the village. Here also after a time, the water-supply was changed, and these malarious attacks ceased. This goes to corroborate the statement, that malaria is an organized substance, which can be separated and handled. Unfortunately, even supposing the "materies morbi" of Dysentery or Malaria were separable and capable of cultivation and modification, it does not seem probable that they will be useful for inoculation purposes, as one attack of these diseases is no preservative against a future attack. I believe this is true also as regards yellow fever, which M. Pasteur is examining with a view to prevention. I have attended some patients four or five times for attacks of dysentery, not relapses, but separated by intervals of one, two, or more years. Still something may yet be gained in this direction, as it would appear that there is a slight tendency to acclimatization, new-comers to a dysenteric district seeming somewhat more liable than residents.

Some have attributed dysentery to chill, or great and sudden differences between the temperature of the day and night. This does not hold good in the highlands of Peru, where dysentery is not common, though the days are often broiling and the nights freezing.

What is the duration of the incubatory stage? No answer has, so far as I know, been attempted to this query. I cannot recall any case of a new arrival being attacked in less than a week. I had one case on board a steamer five days after leaving port. No other case appeared amongst the passengers or crew, so that it is probable the patient received the poison when in the last port (Valparaiso).

Symptomatology.—If dysentery were simply a colitis, as some still call it, one would expect fever to be one of its constant concomitants; but such is far from being the case. Thirst, though sometimes troublesome, is often not present. In fact, no one system is constant or pathognomic, excepting the stools. Even tenesmus may be absent. This happens in those cases where the cæcum or ascending portion of the colon are the parts affected. This class of cases is often rebellious to ordinary treatment. There may be retention of urine, some patients not passing urine for twenty-four hours or more. When this occurs it is generally in "membranous" cases. The introduction of the softest well-oiled gum catheter produces great pain. There is always found a small quantity of high-coloured urine in the bladder.

The tongue varies from perfectly clean and moist to yellow or even dark brown and is perhaps dry. At times the yellow tinge extends even to the borders and tip. It is not strange, however, that the tongue should vary so much, seeing that even in health there are great differences in tongues, some being small, sharp-pointed; others looking too large for the mouth, with round broad tip; some perfectly clean, even when the owner has all sorts of diseases; others dirty even when the person is in the best of health, and the possessor will say that he has never seen it clean; others in perfect health have a raw-looking, fissured tongue, with a few mushroom-like papillæ distributed over it. The different kinds of tongues found in healthy individuals would be a good subject for a monograph.

Sequelæ.—Paralysis I believe to be rare as a consequence of dysentery. I can only recall one clear case. It was that of a boy, æt. 16, who suffered a long severe attack. During convalescence he had, from imprudence in diet, a relapse which yielded to treatment more quickly than the primary attack. He was again convalescent, and, though weak, walking about during ten days, when his legs became so paralysed that he had great difficulty in getting about. From this he recovered in about five weeks, or rather more.

Another of the sequelæ, which is occasionally seen, is a torpidity of the colon, sometimes accompanied by extreme irritability of the rectum. The patient, eating, digesting, and feeling well, has sudden and extremely urgent calls to stool. He will then pass a small mass of natural fæces with a little mucus and much tenesmus. The best thing for this is to have the bowels well moved once a day by means of pills containing strychnine, aqueous extract of aloes and myrrh. At the same time the patient should not move about much.

The connection between dysentery and liver abscess, as cause and effect, can very rarely be distinctly made out. It would, perhaps, be better to say that they have a common origin, something like ague and enlarged spleen, than to say that the one is a consequence of the other.

To write about the treatment of dysentery may seem to some a work of supererogation. I think, however, that there is still something useful to be said on the subject; moreover, even by the profession, the ipecacuanha treatment is not universally recognised as the proper one. It is not very long since I read in a medical periodical the following advice given by a correspondent to *confréres* proceeding to a seat of war where dysentery was to be expected. "Take a good supply of nitrate of silver, or sulphate of copper and opium pills, for cases of dysentery." Even in Squire's much approved *Companion* (5th Ed.), only under Dover's powder is dysentery mentioned, not directly under ipecacuanha, which is its proper place, for if there are such things as specifics in medicine, ipecacuanha is one of them, as much as quinine, or potassium iodide, or salicylate of soda. Even the laity know something of the specific uses of quinine and potassium iodide. Unfortunately they know nothing about ipecacuanha in dysentery, and often have foreign workmen come to me after dosing themselves with brandy, brandy and cayenne pepper, chlorodyne, or something equally noxious. One word as to chlorodyne. As it is a convenient and fairly elegant combination of several powerful drugs, it is much used by travellers, and may even be often found in the domestic medicine chest. I do not deny that it is useful in many complaints, but in dysentery, which it pretends to cure (see label), it is worse than useless—it is highly injurious. A patient is seized with dysentery. He takes a dose of chlorodyne. He then has a few hours of quiet. The dysenteric symptoms most certainly return, to be again temporarily relieved by a dose, probably a little larger than the first, and so he goes on. Meantime the disease is taking a firmer hold and he is disordering his stomach, so that it will be in a less favourable condition than at first to receive *the* remedy when he at last puts himself under treatment.

The ipecacuanha treatment seems to have been used in Peru. "Raiz antidysenterica" is its Spanish name. When I arrived at Lima, some twenty years ago, I found it being used. But the Peruvian physicians employ a somewhat different method of administering it. One drachm of bruised root is placed in sixteen ounces of boiling water for half an hour to six hours or more. Of this infusion a wineglassful is given every half-hour or hour, according to the severity of the symptoms. Another drachm is infused in a smaller quantity of water and administered as an enema. I have not found this so generally satisfactory as my usual treatment.

Before entering upon this subject I would repeat, for they cannot be too often repeated, the words of an Indian surgeon: "Treat every case of dysentery from the first as if it were serious, however slight it may appear." These are the words of one who must have had much experience, and been a good observer. Dysentery, though generally beginning sharply from the first, sometimes commences very insidiously. In most of the latter cases when, owing to the slightness of the symptoms, or the desire to avoid laying the patient up and giving him a nauseous dose, I have been weak enough not to follow the above advice, I have had reason to regret it. It is true that some cases do get better without any active drug treatment, especially if they remain in bed, but they constitute the exception, and seem to be more liable to relapses.

My usual treatment is as follows: The patient is to be put to bed, and, if his stomach is empty, after having a mustard poultice applied to the pit of the stomach for half an hour, he will then take the half of the following draught:—

℞ Pulv. ipecac. ʒj gr.
Liq. morph. hydrochlor. fl. ʒj.
Aq. fl. ℥ij.

For those who like sweet things, a little syrup of gum may be added; but generally patients in the first stage of dysentery do not like sweets—even great smokers at this stage dislike tobacco. After taking the medicine the patient may rinse out his mouth, but ought not to swallow anything—at most, small bits of ice if very thirsty—and remain lying down, if possible to get some one to read to him so as to engage his attention. The natives like smelling at a lemon to keep off the nausea. Whatever is done, in from half an hour to an hour nausea supervenes, and what looks like the whole of the ipecacuanha is rejected The patient as soon as possible must resume the recumbent posture, and if he can, go to sleep. Vomiting frequently brings on a drowsy feeling, moreover this tendency will be favoured by the fact that all calls to stool have ceased. He should still deprive himself of liquids. Probably in an hour or more he may have another attack of vomiting with much nausea and retching. The vomited matter will still show some of the powder, but will be more composed of bilious, acrid fluid. Sir J. Fayrer recommends a little sodæ bicarbonas to be added to the draught, so as to modify somewhat this acrid vomited matter. I should think (for I have not yet tried it) that it would be useful, as in many, even the taking the ipecacuanha leaves a burning sensation in the throat. These attacks of vomiting may be repeated several times.

Five or six hours having passed since the dose was taken, a teacupful of chicken soup, with very little salt and with the fat skimmed from it, should be given. This also may be vomited, but if repeated after an hour or two, as it ought to be, will be retained. The patient may now also drink to any reasonable extent. I generally give infusion of linseed, without liquorice, but with plenty of gum. The drink may be varied of course, *e.g.* toast and water, decoction of guava flavoured with a piece of quince, &c., the essentials being that the water is well boiled, and has plenty of gum added to it. Next morning, however well the patient may appear, the other half of the draught ought to be taken, and the same routine followed as to diet, drink, and the recumbent posture. On the third and following days you will probably find your patient with a considerable appetite, and your endeavour should be to keep it within bounds, both as to quantity and quality. He should at first have no solid or even farinaceous food. Better to confine him to soups (fowl, with mutton or beef, or both), a fresh raw egg beat up and added to the soup when the latter is served; if rice is boiled in the soup it should be strained off; isinglass or gelatine jelly; broiled steak to be chewed, but only the juice swallowed; weak tea with very little sugar and with new milk. Milk does not agree with every one even in health. When it does agree it is the most valuable article of diet. Curds, especially when made with milk warm from the cow, so that it requires no artificial heating, are well digested by many. Later on he may swallow underdone broiled steak or chop, boiled mutton, or fish. Now may be used arrowroot or other farinaceous articles, cooked in water flavoured by boiling in it guava, quince, roast apples, dried or fresh peaches, &c., or these flours cooked in milk may be eaten with a little red or black currant jelly. Bread should be dry and thoroughly toasted, not with a layer of soft moist crumb in the centre. If potatoes are used they should be passed through a fine sieve, and they are then much more easily digested than whole rice. The natives have a peculiarly prepared—partly by freezing—potato, called "chuno," which, when pounded and boiled with rice, is agreeable to the taste and easily digested. The patient should be slow to resume active exercise. A broad piece of flannel enveloping the abdomen and lumbar regions is comfortable, and probably useful.

This is the ordinary and successful treatment of a common case of dysentery seen at or near its commencement. There is nothing new in it, nor will any startling novelty be found in the remarks which follow; but I think that a strict attention to apparently trifling minutiæ, in medicine as in surgery, will sometimes make all the difference between conducting a case to a successful issue and the reverse. All these details about diet may seem trifling, but they will be found useful when one has to deal with the ravenous appetite of a convalescent from dysentery. Under the influence of this hunger the most sensible of patients will become like children in their cravings for often the most ridiculously unwholesome articles of "gourmandise" (things that in health they would not think of touching) and in their total disregard of consequences.

It will have been observed that I prescribe the narcotic along with the ipecacuanha. In hospital practice, or with educated people, it is preferable to give the narcotic half an hour at least before, but with others this will not do, as they are apt to make mistakes, and one may find upon revisiting the patient the next morning that he has only applied the sinapism and taken the narcotic, and, finding himself much relieved, has not taken the essential part of the prescription, with the result of a return of the symptoms, and perhaps a reapplication of the sinapism, and another dose of narcotic. This is often conduced to by the fact that many patients have a great objection to taking ipecacuanha. It is like the case of one suffering from toothache, he is apt to prefer any nostrum that slightly soothes, to the *radical* remedy.

I think a dose of from forty to sixty grains is a proper dose of the powder. I make this remark as I have noticed in recent literature a tendency to employ smaller doses; such have not seemed to me equally efficient. Strict diet and the recumbent posture cannot be too much insisted upon. Many have said that ipecacuanha in large doses does not provoke emesis. This does not accord with my experience. As a rule it does provoke vomiting, and one great object is to get the medicine retained for at least half an hour; if it is retained for an hour or more so much the better. There are cases, and they are very grave, which take and retain the ipecacuanha as if it were so much water. They will be found to have dark brown fluid stools with little clots of blood, small pieces of dead tissue and a most offensive odour. There are other cases where the ipecacuanha is rejected so instantaneously that it has no curative effect. This is most apt to take place in those who have an exceedingly foul yellow tongue, or who have a great repugnance to the remedy, or to any remedy. In these cases, especially in those with the yellow tongue, I have given podophylline in small doses frequently repeated:

℞ Resinæ podophylli.
Pulv. ipecac. āā. gr. j.
Ext. hyoscyami, gr. viij.
Divide in pill viij. ♏.
Sig. One every hour.

This prescription may be modified, especially in the direction of augmenting the ipecacuanha if it is found not to cause nausea in this form; also a good addition is ext. belladonna, or the pills may be smaller, or not so strong, or repeated more frequently. I have found podophylline a more certain cholagogue than either euonymin, or iridin. I have cured dysentery with these pills alone, but when possible, it is advisable to assist the cure by enemata containing ipecacuan. It is remarkable that nausea is not caused by ipecacuanha enemata in any dose, and even though completely retained. I was led to employ podophylline in the above manner by observing that the most common effect of the ipecacuanha is to cause bilious diarrhœa. This is not, however, its constant effect. Sometimes it causes simply a cessation of all the symptoms of dysentery, the bowels remaining perfectly quiet. In that case I am not in any hurry to act upon the bowels; the longer (not exceeding two or three days) they are quiet the more chance they have of returning to their normal condition; moreover, when deemed necessary, they are easily made to act by an enema of warm water with a little soap and oil. I think this is better than giving castor-oil by the mouth.

If the tongue should remain yellow after the ipecacuanha and the patient complain of a bitter taste, then I give pills of Podophylline gr. $\frac{1}{4}$, Ipecac. gr. j. or more, Ext. Nuc. Vomic. and Ext. Belladon. of each a quarter or third of a grain, thrice a day. A quarter of a grain of podophylline twice or thrice a day seems to be a better cholagogue than a third of a grain.

These remarks are leading me into the treatment of those cases which yield either only partially or not at all to the action of ipecacuanha. Dysentery may be regarded as a satisfactory disease to treat, one cuts it short just as clearly as one does an intermittent fever. But when one cannot do this, then dysentery becomes a most unsatisfactory disease to deal with, tending to become chronic or to end in something worse. I have already treated of some of the more simple difficulties, I shall now discuss some of those rather more unmanageable.

The first dose of ipecacuanha has been taken and has produced a tranquilising effect, but after a few hours the tenesmus returns. The ipecacuanha may be repeated. I prefer, however, to let an interval of twelve or more hours elapse between the doses, as I think there is thus more chance of the second dose being fairly retained and so having a better effect. Meantime something must be done to alleviate the sufferings of the patient. Enemata here come into play. When they are used, one or two little things ought to be attended to so as to derive all the benefit possible from them. They should be administered shortly after a stool, they should be given warm and slowly; to assist retention a warm folded napkin may be pressed upon the anus and the patient should at first lie upon his left side. One may try the ipecacuanha enema. It may be given in the form of one drachm of the powder in two ounces of warm water with a little gum or starch, or infusion of the bruised root is perhaps a better form because more easily absorbed, but always with some fifteen drops of tinct. opii. A common and useful prescription is

℞ Pb. acetat. gr. xxxij.
Tinct. opii. fl. ʒ ij.
Aq. ferventis. fl. ℥ viij.
M.

Two tablespoonfuls of this with an equal quantity of water sufficiently hot to make the whole tepid. This if rejected immediately should be at once repeated. If completely retained, *i.e.*, if there is no further call to stool, no second enema is administered. If only producing temporary relief it may be repeated more or less every four hours. Acetate of lead like other astringents, mineral or vegetable, is injurious when taken by the mouth, and when given by enema is not given with the idea of curing the disease by it excepting in so far as it may conduce to this result by procuring rest. Other enemata are used by the natives, *e.g.*, infusion of linseed, warm milk and decoction of poppy-heads with starch. I have not found the nitrate of silver injection as good as one might expect from the way in which some authors speak of it.

But supposing the patient has taken his two doses and otherwise carefully attended to instructions and is still suffering. There are then other courses open. Firstly, it may be that the ipecacuanha is causing the irritation. I have on several occasions received the impression that such was the case, and I have been made more suspicious by the following case. I do not pretend that it is at all conclusive, for in the end he was cured by the ipecacuanha. An Englishman presented himself at 1 P.M. complaining of want of appetite and nausea, otherwise he was well, no fever, pain, or irregularity of the bowels. His tongue was very yellow. I ordered him thirty grains of ipecacuanha, to be taken at 6 P.M. as he left his office at that hour. At 11 P.M. I was called to see him and found him suffering much from frequent dysenteric stools. I ordered him a narcotic for the night and a forty-five grain dose of ipecacuanha to be taken at 6 A.M. next morning. In the middle of the day I found him well, no return of dysenteric symptoms and tongue clean. I now ordered him nitro-hydrochloric acid with infusion of chiretta. This is a tonic recommended by an Indian surgeon in convalescence from dysentery. It is very good and very applicable in the class of cases I am speaking of. It will often be found that upon beginning this medicine, the day after the second dose of ipecacuanha, the slight remaining dysenteric symptoms disappear or, at the utmost, may require one or two of the lead injections.

Secondly, the symptoms being a little more severe than in the last class of cases, one may try drop-doses of vin. ipecac., but I find the following prescription better :

℞ Pulv. ipecac. gr. iij.—xxxvj.
Pulv. opii. gr. ij.
Bismuth trisnitrat. ʒj—ij.
Pulv. gum acaciæ, gr. xx.
Divide in chart. vj. M.
Sig. One three times a day.

Of course the proportions may be varied, the larger the dose of ipecacuanha which can be taken without upsetting the stomach the better. These powders may also be advantageously used by enema. What will be found very soothing in these and other cases, especially where there is abdominal pain, is a large, thick, warm linseed poultice with a little mustard, embracing more or less the anterior of the abdomen. The poultice ought to be overlapped by a large piece of folded flannel. This, especially if applied at night, will often make the patient sleep, which is a great benefit.

Thirdly, supposing the case to be a very little better than at the beginning, what is to be done? I am very unwilling to abandon the ipecacuanha treatment, as I have too often found that, if one cannot make a decided impression with it, the case will not do well under any other treatment. I have, therefore, persisted with the ipecacuanha in large doses; sometimes repeating it as many as nine or ten times with perhaps an occasional interval of forty-eight hours or more. The question may be asked here, does ipecacuanha in these large frequently repeated doses not cause any bad effects? I cannot say that I have observed any excepting in one case. A woman, æt. sixty, had that form of dysentery which gives rise to the discharge of grey, wash-leather-like portions of membrane. She had been suffering some fifteen days, and during that time had taken nine doses of ipecacuanha. At last one day upon visiting her I found that she had discharged a large mass of this membrane looking like a cast of the cæcum and part of the colon. The stools had immediately changed in frequency and in character. There was now only an occasional call to pass, without pain or tenesmus, a pale-yellow, soft, what might be called healthy, stool. This very often happens in these cases; once all the membrane is discharged, the patient is well so far as the bowel complaint goes, but he will require very careful nursing afterwards. The patient had a little cough. Next day this symptom was more troublesome, and upon examining her I found signs of consolidation at both bases posteriorly. She then had pneumonic-like expectoration, and on the sixth day died. This may have been merely hypostatic, resulting from prostration and the recumbent posture; but I mention it as I think I have read something about ipecacuanha (and tarter emetic) given in large doses to some of the lower animals and retained in the stomach by deligation of the œsophagus causing red hepatization of the lung. The above case was one of those beginning in the cæcum, so that the pain is confined to its neighbourhood, and, though there are dysenteric stools, there is little or no straining at first. As I have observed, this class of cases does not respond so quickly as ordinary cases to the remedy, but they are generally cured by perseverance in its use. Ext. Nuc Vomica has been recommended, I think by Sir R. Christison and others, in gangrenous dysentery. I suspect that it is in this membranous class that it has been found useful, but as I have remarked, they have a tendency to get better. The extract may act as a tonic and excitor of peristaltic action, thus assisting the throwing off of the membranes.

It is in those cases where numerous doses of ipecacuanha require to be given that one has to vary the form of administration, otherwise the patient acquires such a repugnance to the drug that, if he does take it, he rejects it at once without its having a chance of operating beneficially. One form, recommended to me by a Peruvian practitioner, Dr. Montesinos, is to place a drachm of powdered or bruised ipecacuanha in a wineglassful (fl. ℥ ij.) of boiling water at night, in the morning give the patient only the clear supernatant fluid. The same dose is repeated on the second morning. On the third night, if the patient is better, the two sediments from the previous doses are treated in the same way and the clear fluid given in the morning. And this seemingly exhausted sediment (but not really so, for it may still cause vomiting), is to be similarly treated for the fourth morning.

I have tried combining chloral hydrate with the ipecacuanha, hoping to procure sleep and so allow time for the drug to act, but it does not answer well by the mouth, as necessarily a considerable quantity of fluid has to be taken. By injection, and with the addition of some preparation of opium, this inconvenience is not felt to the same extent, for sometimes a pretty large injection can be retained. I have also tried the lamels of emetia in protracted cases, and found that they have an effect. I have even cured some mild cases with them alone, giving almost two for a dose. Each lamel is said to contain the eqivalent of twenty-five grains ipecac. I am tempted to try them more thoroughly as they are so easily taken (the ipecac. is a nauseous dose); but hitherto I have not had the courage to abandon the ipecacuanha itself. Firstly, because it has been proved efficacious. Secondly, the lamels, if taken with the precautions of a morphia lamel half an hour before, &c., do not produce vomiting, which makes one somewhat doubt their efficiency. Perhaps some day soon we may cure a case of dysentery with one or two hypodermic injections of emetia.

I have given these large doses of ipecacuanha to patients with advanced heart disease, and in all stages of pregnancy without observing any bad result.

Acute dysentery, or what seems to be so, in infants, or very young children, is not so successfully treated by ipecacuanha. The treatment recommended by Dr. West (*Diseases of Children*) seems more suitable. I may here mention a case of some little interest. I was attending a child æt. 6, whose case was falling into the chronic state in which astringents are often advantageous *in children.* I had prescribed a mixture containing gallic acid. On the following visit I was told that she was improved, but that there had been some difficulty in getting her to take the medicine on account of its bad smell. Upon examining it I perceived the smell of carbolic acid. Inquiring at the druggist's, it turned out that he had put in the latter instead of the former. Happily the child had clearly benefited by it; so much so that I continued it for a day or two longer.

Chronic dysentery is generally a long, tedious, and serious disease to have to deal with. As I said at the beginning of this paper, I do not pretend to give systematically the treatment of dysentery, for that the reader must go to Reynolds's *System of Medicine*, or other works; I merely offer some observations derived from practice. For that reason, when making a note or two upon chronic dysentery, there is no use of my writing about diet, so justly and strongly insisted upon by Sir J. Fayrer in his *Tropical Diseases*, the importance—the absolute necessity, sometimes—of change of climate, and so on.

It is a curious fact that a few cases of chronic dysentery are cured by a couple of doses of ipecacuanha. These cases may have lasted for months, but generally have not prostrated the patient much; and I am speaking of cases which are not suffering from an acute exacerbation when they come under one's notice. This would seem to prove that there are cases of chronic dysentery where there is no ulceration, but more probably some affection of the mucous membrane resembling erosion of the os uteri. When I say that they are cured, I mean that all dysenteric stools cease, and one keeps them on diet and at rest for a week or more, only as a precautionary measure. For this reason when a case of chronic dysentery is first brought to me, I think it always worth while to give the ipecacuanha a trial before proceeding to other measures.

A remedy well spoken of by Sir J. Fayrer is the Bael fruit. I believe that it belongs to the quince family, at least the agreeable confection made by Squire has a decidedly quince-like taste and smell. In Peru the guava, or guayava as they call it, has a reputation for curing chronic and even acute dysentery. The Peruvian guayava has similarities to the Bael, as the latter is described in its fresh state. Both have a somewhat terebinthinate flavour, and in both, the seeds are enveloped in a copious mucilage. I have seen the guayava produce good effects.

Cold bathing in fresh-water rather than in salt-water improves some cases. Where I practise (Arequipa, Peru) patients resort occasionally with benefit to warm sulphur-baths in the neighbourhood, and where there is also a chalybeate water, which they take internally. It may be observed that here are most opposite remedies—cold and hot baths recommended; and without doubt very different remedies have been found useful. One native practitioner, who had a reputation for curing this disease, trusted much to the use of saline purgatives, generally sulphate of magnesia with manna; on the other hand, a favourite remedy in Lima is the decoction of the rind of the pomegranate fruit, a powerful astringent. Salines are often useful.

Enemata are always required. They may be either small containing bismuth, ipecacuanha, opium, lead, &c., or large. A copious injection of plain tepid water, slowly administered, is often very soothing; it may be medicated with carbolic acid, boracic acid, borax, potassium chlorate, salicylate of soda, hazeline, glycerine, or other substances.

I shall conclude this paper with the history of a case which may be read with benefit in connection with the subject under consideration. One morning a man presented himself in my consulting-room. He was much emaciated; in fact presented what Professor Layccock would have called the cancerous cachexia "facies," and was very weak. He stated that he was suffering from chronic dysentery, and had been so for more than six months. He described his stools, tenesmus, &c. He had been in hospital for two months, but left as bad as when he entered. He was a poor man, living about five miles from the town, and used to come to see me about twice a week. After about six weeks attendance he was, if anything, worse than when I first saw him. He then told me that he was sure he had piles, and begged of me to operate. This statement was brought about by his recounting his sufferings to a neighbour upon whom I had recently operated for piles. As is usual with uneducated people they found that their symptoms exactly coincided. I made a superficial examination but found no appearance of hæmorrhoids. He insisted, however, so much upon my doing something for him that I told him to come into town, take a dose of castor-oil in the morning, followed by a large injection of warm water in the middle of the day, and that I should then visit him. I was the more willing to do this, not because he had any symptoms of piles, but more from a feeling of curiosity to examine, as far as possible, the state of the rectum in a case of dysentery which had now lasted about eight months. He followed instructions, and upon examining the rectum I was surprised to find that there were fibrous bands extending in all directions, some being unattached excepting by their extremities. To facilitate a more thorough examination and the breaking-up of these bands, I forcibly over-distended the anus, and now, while breaking them up, I touched a hard substance. Introducing a dressing-forceps between the fingers I easily extracted a triangular piece of bone (beef ?) Its longest diameter was about two-thirds of an inch; two of its angles and one of its sides were as sharp as knives; its thickest part was about the eighth of an inch. No one was more astonished than the man himself upon seeing this bone, for he had no recollection of having swallowed such a thing. A quantity of dirty offensive pus escaped during the manipulations. I broke up the fibrous bands as far as I could, but felt that there were still others out of reach. Accordingly, next day I returned with a pair of so-called "abortion forceps," and guiding them with the index finger into the higher part, expanded them as I had done with the fingers lower down, until I felt that all was soft and yielding to the touch. The only after treatment was washing out the rectum with warm carbolised water, at first thrice a-day. There were no more dysenteric-like stools, and in a few days he left town. Some months afterwards I saw him. He had completely lost his cachectic look, appeared much younger, and was stout and florid. One would have thought that this was a case very favourable to the development of liver abscess, but he had no further trouble.

A PECULIAR IDIOSYNCRASY (INDUCTION OF PYREXIA) AS TO MERCURY.

BY SIMEON SNELL,

Ophthalmic Surgeon to the Sheffield General Infirmary, and to the School for the Blind.

Mrs. C., a widow, aged 41, by occupation a monthly nurse, was sent to me on October 26, 1881, by her medical man. For some weeks she had perceived that her sight was getting defective, but, especially the right eye, had become worse quite recently. She had suffered from slight rheumatism at different times, and now attributes her complaint to "cold," but there seems good reason to suspect a specific taint.

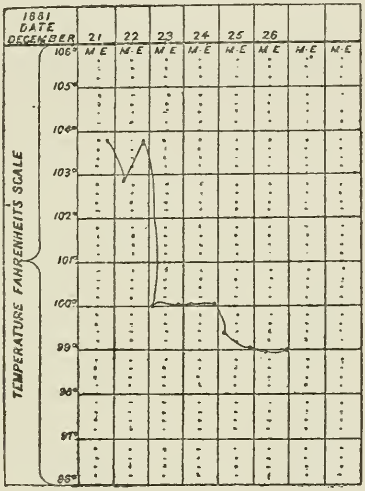
In both eyes the vitreous humour was hazy, and floating films were noticed, especially in the right eye. The left pupil dilated well to atropine, but the right displayed a tag of adhesion at its lower part. R. V. $=\frac{20}{70}$; L. V. $=\frac{20}{50}$. The patient was hypermetropic ($\frac{1}{36}$), and the vision of the left eye was materially improved with the appropriate glass. Iodide of potassium in 4 gr. doses, with cascarilla, was prescribed; and atropine drops were ordered to be instilled into the eyes.

Oct. 29.—She is to-day somewhat better.

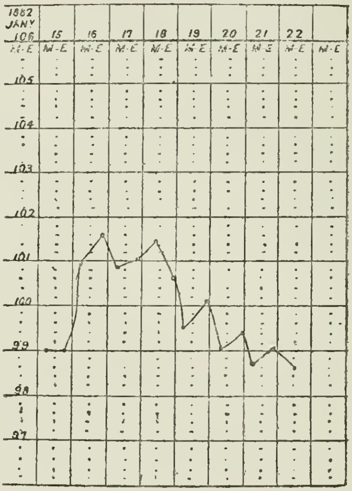
Nov. 8.—In the right eye a more acute phase of iritis is noticed, and in the left the films in vitreous are more marked. A drachm of the liquor hydrarg. perchlor. was now added to each dose of the mixture.

In the course of the next few days I heard from her medical man that she was much worse; "he was at a loss to account for her symptoms;" and on the 12th he had stopped the mercurial. He desired me now to admit her into the Infirmary. The patient has since told me that she commenced the fresh medicine (hydrarg.) on the 9th, and that after three doses of it she felt ill, and continued to get worse while she was taking it.

On Nov. 18 she came to the Infirmary, but appeared so weak, and told me also "that the vomiting which commenced whilst taking the medicine," had only ceased for a few days, that it seemed desirable to place her on the medical side of the house, and she thus passed under the care of my colleague, Dr. Bartolomé. Under his treatment her general health rapidly improved. On December 20, however, the perchloride was again ordered. The next day the temperature had risen to close upon 104°. There was vomiting, also, not merely after food or drink, but at other times; the tongue was furred, and complaint was made of pain in the head. On the discontinuance of the mercury and the substitution of a stomachic, the temperature fell, with a corresponding improvement in her general condition. The annexed chart shows the temperature tracing of the few days alluded to; and subsequent thermometric observations displayed a normal temperature, with occasionally a very little above.



As I have intimated, she recovered again, and on January 12, 1882, was transferred to my care in much improved health. The pupils dilated well under atropine, but the edges were somewhat irregular, and the vitreous in both eyes was turbid. In addition to continuing the atropine, on January 15 a mixture of citrate of iron and quinine was prescribed, and a powder of 2 grains of hyd. c creta was ordered to be taken twice daily. She probably had one of these powders the same evening, and as will be seen from the annexed chart, there was a rise of temperature, with the vomiting and general disturbance as before. I believe she only had three, or at the most four powders. The fall of temperature after their discontinuance is well shown in the chart; there was a subsequent rise, caused, I fancy, by a troublesome alveolar abscess.



Under small doses of potassium iodide she has since done well.

The foregoing case is of interest as exhibiting an unusual effect of mercury. It is not uncommon to meet with cases in which a small dose of the drug has produced salivation, but in the case under consideration there were no signs of ptyalism.

Twice, however, it is seen, that a rise in temperature occurred after the administration of the mercurial. No record is at hand of the temperature in the illness, after the use of the perchloride of mercury and iodide of potassium before admission to the infirmary. I apprehend, however, that there can be little doubt that it was similarly affected as in those instances more closely observed.

It should be added that the urine was normal.

THE NERVOUS SEQUELÆ OF SCARLET FEVER.

BY D. MANSON FRASER, M.A., M.D.

Assistant Medical Officer to the Metropolitan Fever Hospital, Homerton.

(*Continued from* Vol. xxviii. p. 440.)

II.—The Immediate or Direct Nervous Sequelæ of Scarlet Fever.

The disturbances of the nervous system occurring as direct sequelæ of scarlet fever affect this system in various ways. Sometimes the higher cerebral centres are affected, producing physical disturbance, and at other times the motor or sensory centres suffer, the result being motor or sensory paralysis, or motor ataxy. The phenomena cannot always be thus distinctly marked off, and mental derangement may be combined with motor paralysis or ataxy, or ataxy may co-exist with some amount of paralysis. One or other, however, of these kinds of effects predominate, and the broad distinction thus formed offers a basis of classification. These sequelæ may be accordingly described in three groups, according to the predominant feature of the disturbance :—(1) Psychical Derangement ; (2) Paralysis ; (3) Motor Ataxy.

1. Psychical Derangement.—Psychical derangement or insanity occurs but rarely after scarlet fever ; much more rarely comparatively than after the continued fevers. Out of 114 recorded cases of post-febrile insanity enumerated by Christian only sixteen are placed to the credit of the eruptive fevers (scarlatina, measles, and small-pox), while the other two fevers (typhus and enteric) which are themselves of less frequent occurrence, caused

no less than thirty-six.[1] How rare it is as a sequela of scarlatina may also be gathered from the fact that in the annual reports of the Liverpool Road Fever Hospital for the ten years, 1871-80, during which time 3,457 cases of this fever were treated, only two cases[2] of this kind are mentioned among its sequelæ, and at the Homerton Fever Hospital, in the same period, during which 3,027 cases of this fever were treated, only one such case occurred. This statement, however, probably underestimates the occurrence of post-scarlatinal insanity, because in some cases it may (as it did in one of the Liverpool Road Hospital cases), have come on after the patient had left the hospital. It is, however, undoubtedly, very exceptional; and in addition to these cases which have been observed at the Liverpool Road Hospital and at the Homerton Hospital, and a few of the sixteen cases mentioned by Christian as having followed the eruptive fevers, which may have been due to this particular eruptive fever, I have met with a record of only five cases.

The notes of the Homerton case, which came under my own observation, are briefly as follows:—

Case 6.—Severe attack of scarlet fever followed by mental weakness: recovery.

Louisa H., æt. 15, was admitted into the Homerton Fever Hospital on March 11th, 1881. She had been ill for two days; she was delirious and collapsed; the tonsils swollen and red; the rash profuse and of a livid red colour. The fever was severe, and there was high delirium throughout; but in ten days the fever had subsided, the rash had disappeared, and desquamation had commenced. She remained physically weak, and her appetite remained poor. The mental condition was one of weakness—almost imbecility; there were no delusions nor hallucinations, nor was there any maniacal excitement, but she was decidedly "silly." This mental condition slowly passed off, and at the end of a fortnight she was perfectly sane. The after course of the case does not concern us, and I may sum it up by saying that after passing through a late attack of albuminuria which first appeared on April 16th, and a transient and mild attack of rheumatism, she was discharged recovered on June 21st, 1881.

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[1] Christian, "De la Folie consecutive aux Maladies aigues," *Arch. Gen. de Médecine*, September and October, 1873.

[2] *Reports of Liverpool Road Fever Hospital* for 1874 and 1875.

Of the other five cases to which I have referred Dr. Scholz of Bremen records two.[1] In one of these, a male, æt. 21, the mental disturbance came on about the tenth day of the fever; it consisted of illusions, and disappeared in less than a fortnight. In the other, a male, æt. 23, great restlessness, confusedness, and illusions appeared on the eighth day of the disease and remained five days. In these cases the result was complete recovery. There was no history of hereditary or other predisposition, and Scholz believes they were due to the anæmia consequent on the fever.

The third case is described by Weber.[2] In this case (girl, æt. 15) delirium accompanied by delusions came on just as the temperature became normal, and lasted one day. Here there seemed to be some predisposition, as the girl, who was of excitable temperament, had had a similar attack after measles about twelve months previously. The case, in its time of occurrence and in its character, bore considerable resemblance to a critical delirium.

The fourth case is recorded by Dr. J. Rabuske of Berlin.[3] In this case (male, æt. 21) great restlessness and delirium accompanied by delusions and hallucinations of sight and hearing appeared after the fever had subsided, and lasted about a week and then disappeared. There was no apparent predisposition, either hereditary or otherwise.

Quite recently the notes of a fifth case have been published by Dr. Mitchell, of Fife and Kinross Asylum.[4] In this instance the patient, a male, æt. 21, was sent to the above asylum eight days after the commencement of an attack of scarlatina and when convalescence had apparently set in. He was noisy, restless, and had delusions and hallucinations. This condition lasted about a fortnight and then disappeared.

The pathogeny of this condition, viz., insanity in some form or other after scarlet fever, is still a vexed question, and various hypotheses have been made—none of them, however, quite satisfactory. Into this point I shall not enter in this paper, and I shall content myself with referring the reader to an interesting paper by Dr. Greenfield, "On Insanity as a Sequel of Acute Disease and Hæmorrhage,"[1] in which the general question is discussed at length.

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[1] Scholz, "Geisteskrankheiten aus Anämie," *Archiv für Psychiatrie*, iii. bd. 3 h.

[2] *Med. Chir. Transactions*, vol. xlviii.

[3] "Ein Fall von Manie nach Scarlatina," von Stabsarzt, Dr. J. Rabuske, in Berlin, *Deutsche Medic. Wochenschrift*, October 1881.

[4] "Acute Mania after Scarlatina," *Edinburgh Medical Journal*, February, 1882.

The prognosis of post-scarlatinal insanity would seem to be favourable. Of the two cases referred to in the reports of the Liverpool Road Fever Hospital one is said to have recovered, and of the other no history is given. The cases observed by Scholz, Weber, and Mitchell, as well as that recorded by myself, all ended in recovery, while Christian, although he does not discuss the prognosis of this special form of post-febrile insanity, says of post-febrile insanity in general: "La durée est généralement courte; la guérison est la terminaison habituelle. Cependant cette folie peut devenir chronique et incurable."[2]

2. Paralysis.—The occurrence of "post-febrile" paralysis is more intimately associated with diphtheria than with scarlet fever, but that it does occasionally follow the latter disease also is a well established fact. Not a few cases have from time to time been recorded, and although some of these—especially in more remote times—may have really been due to diphtheria, yet it is by no means improbable that some cases placed to the credit of that disease may have resulted from scarlet fever, with which diphtheria is even now sometimes confounded. As a result of scarlet fever Imbeyre-Gourbeyre thinks it must often have been observed, because, says he, "Klein counts this affection among the sequelæ of the disease, and J. Frank declares he has met with many examples in his practice."[3] Gubler, too, seems to be of the same opinion, and in reference to a case he relates he remarks: "En interrogeant ses souvenirs chacun de nous pourrait aisement retrouver un fait plus ou moins analogue aux precedents."[4] In speaking thus of the frequency of post-scarlatinal

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[1] *St. Thomas's Hospital Reports*, New Series, vol. iv.

[2] Christian, *loc. cit.* Bucknill and Tuke in a recent edition of their work on Mental Diseases also consider the prognosis of post-febrile insanity as generally favourable.

[3] *Loc. cit.*

[4] *Arch. Gen. de Méd.* 1860, "Des Paralysies dans leur rapport avec les Maladies aigues."

paralysis, both the writers quoted include not only the direct but the indirect paralytic sequelæ. To the latter class Landouzy considers most of the cases really belong, and of the former he speaks as exceptional and rare.[1] Whether the majority of the cases are to be deemed only indirect sequelæ is open to considerable doubt, but that the direct paralytic sequelæ are, in proportion to the number of cases of the fever, comparatively rare cannot be questioned.

The indirect sequelæ of this class I have already discussed, and I shall now endeavour to point out some of the various forms of the direct class.

(1) *Infantile Paralysis* has occasionally been observed to appear during the convalescence from scarlet fever. Ross speaks of this disease as very liable to occur in the course of the acute exanthemata,[2] and Dr. Lewis Smith enumerates among its causes "a certain change in the blood not fully understood, induced by certain grave diseases, as diphtheria, scarlet fever, &c." [3]

(2) *Hemiplegia.*—Cases of uncomplicated hemiplegia coming on during convalescence from scarlet fever have been observed by Kennedy,[4] Hughlings-Jackson,[5] and Taylor.[6] In the cases recorded by Kennedy and Hughlings-Jackson recovery took place; in that recorded by Taylor death was the result. Hemiplegia complicated with strabismus, coming on on the tenth day of the fever, and ending in recovery, was observed in one case by Desesarts.[7] A case of hemiplegia with amnesia, also ending in recovery, has been described by Addy; [8] and more recently Barlow [9] describes post-scarlatinal hemiplegia complicated with facial paralysis.

A case in which temporary hemiplegia occurred after scarlet fever, and in which there was a recurrence of nervous disturbance after the lapse of years, has been observed by Dr. Edmunds at the West End Hospital for Nervous Diseases. Dr. Edmunds's notes (communicated to Dr. Collie, to whom I am indebted for their use) describe paralysis of the left leg and arm, coming on in a boy æt. 5, two months after an attack of scarlatina, and disappearing in the course of fourteen months. About thirteen years after this there came on numbness of the left leg and arm. There was no heart disease, no dropsy, and no rheumatism.

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[1] Landouzy, *loc. cit.*

[2] *Diseases of the Nervous System*, vol. ii. p. 977.

[3] *Diseases of Infancy and Childhood.*

[4] Quoted by Gubler, *loc. cit.*

[5] "Hemiplegia after Scarlet Fever," *Medical Times and Gazette*, 1862.

[6] Dr. Frederick Taylor in *Clin. Soc. Trans.* vol. xiv.

[7] Quoted by Imbeyre-Gourbeyre, *loc. cit.*

[8] B. Addy, "Partial Hemiplegia with Amnesia," *Lancet*, May, 1875.

[9] *Med. Times and Gazette*, April 17, 1880.

With regard to the pathology of this condition Jackson believes it will probably be found to be due to plugging of the middle cerebral artery, and he suggests that as this may be caused by embolism the heart should in all such cases be examined. In his own case, however, he believes that no heart mischief existed. Addy thinks his case due to meningitis and thrombosis of the left middle cerebral artery. Barlow ascribes the symptoms in his case to dilatation of the heart and thrombosis. In the case of Taylor a post-mortem examination was made, and revealed plugging of the left middle meningeal artery with cerebral softening; there was no endocarditis. It seems probable that the pathological cause is generally to be found in embolism or thrombosis.

(3) *Aphasia* occurs either accompanying hemiplegia or as the sole evidence of nervous disturbance. "Les accidents paralytiques mêlés à des troubles cerebraux et notamment à l'aphasie paraissent être la forme la plus communément observée dans la scarlatine."[1]

(4) Paralysis of both arms has been observed by Delius, who published in 1777 a small monograph, "De paralysi utriusque brachii post febrem scarlatinam."[2]

(5) *Paraplegia.*—Gubler[3] quotes a case of this variety of paralysis recorded in a thesis by M. V. Revillout, and a case of the same kind has come under my own observation. The notes of the latter, briefly detailed, are as follows :—

Case 7.—Paraplegia after scarlet fever: recovery.

David B., æt. 5, was admitted into the Homerton Fever Hospital on October 20th, 1880, suffering from scarlet fever, and presented the rash and symptoms of that disease. The fever ran a mild course, and on November 29th he was ordered up.

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[1] Landouzy, *loc. cit.*

[2] Quoted by Imbeyre-Gourbeyre, *loc. cit.*

[3] *Arch. Gen. de Méd., loc. cit.*

Now, however, it was observed that there was complete paralysis of the lower limbs. Accompanying the paralysis there was no pyrexia, and the sphincters were unaffected. The boy was otherwise well, save that the tonsils remained enlarged. For weeks there was no perceptible change in the patient's condition, but about the beginning of January he began to mend, and on February 3rd the improvement was so marked as to permit his walking. On March 5th the paralysis had disappeared and he was discharged. The paralysis lingered longest in the peronei muscles.

(6.) Paralysis of the velum palati, so common after diphtheria, seems to be very rare after scarlet fever, if, indeed, it ever does occur. One doubtful case is quoted by Imbeyre-Gourbeyre[1] from Fulter (*Journal de Hufeland,* t. xix.).

(7.) *Sensory Paralysis.*—Of this, the only case I have seen recorded is quoted by Gubler[2] (from the *London Medical Record* of 1811), in which all the special senses became affected save touch. According to Germain Sée, sensory paralysis is the primary result in post-febrile paralytic affections, and he affirms the essential dependence on anæsthesia of the disorders of motor-power consecutive to diphtheria, fevers, &c.[3]

3. ATAXY.—Muscular ataxy occurs very rarely in the convalescence from scarlet fever. One case has come under my own observation, of which the notes are as follows:—

Case 8.—Aphasia and muscular ataxy consecutive to scarlet fever.

Wm. M., æt. 12, was admitted into the Homerton Fever Hospital on December 4th, 1880, with the usual signs and symptoms of scarlet fever.

Up to the commencement of the fever he was healthy, but he was a very "nervous" child, and just before admission he had received a severe shock from the death of a sister from this fever. Patient's father suffers from rheumatism. After admission he was very restless and delirious and had no sleep, but the fever was not high. He was treated by warm baths,[4] which, after the first one, he took to kindly. On December 11th the temperature had become normal, the delirium and restlessness had disappeared, and convalescence seemed to have set in. Considerable nervous disturbance of a different character now, however, was observed, and his condition was thus described in my notes:—"Expression stolid, almost idiotic; intelligence apparently very low; patient very emotional, and is easily made to cry. Speech is entirely lost. He cannot raise himself in bed, and when he is raised to the sitting posture a nodding movement of the head sets in. On being supported on his legs and trying to walk the movements of his legs are markedly ataxic, and when he tries to turn over in bed his legs jerk about irregularly. No absence of the patellar tendon reflex. On any attempt at movement of the arms there is irregular jerking. These spasmodic movements occur only on voluntary movement, and the main direction of locomotion persists. No impairment of sensibility. Sphincters relaxed. Eyes present no abnormal appearance (not examined ophthalmoscopically). No morbus cordis and no albumen."

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[1] *Loc. cit.*

[2] *Ibid.*

[3] *A Yearbook of Medicine and Surgery* (N.S.S.), 1861, p. 161; *Union Médic.* No. 133.

[4] *Practitioner*, July 1881, p. 35, Case II.

December 24th.—There has been slight improvement. He seems much more intelligent and is less emotional. Sphincters still relaxed, but after relaxation he cries as if he knew he had done wrong. No other change.

December 31st.—Paralysis of sphincters gone. Slight general improvement.

January 18th, 1881.—Has had slight exacerbation of symptoms during the last few days, but is now again improving. Getting stout.

January 22nd —Has been able to stand for a few seconds without support. There is no longer head-tremor, but the jerking movements of the arms persist, though to a less extent. On trying to write, he makes only irregular scratches. To-day he has spoken for the first time; on his mother's leaving him he said with difficulty, "Bye, bye."

January 30th.—Is now able to articulate a few simple words, such as "dinner" and "yes"; he speaks with difficulty, and, as it were, blows the words out. He seems much more intelligent, but there is no further improvement as regards movement. After this date the condition of the patient remained stationary, and in May he was discharged as the hospital was about to be opened for small-pox. Since then I have lost sight of him and have been unable to learn anything further regarding him.

A case somewhat similar to the above, and the only recorded case of the kind after scarlet fever I have been able to find, is described by Dr. A. B. Shepherd.[1] In this the movements were like those of "ataxie locomotrice." The patient was at first speechless, and when speech began to return he spoke with a blowing sound; when he attempted to write he made merely a few scratches. The case ended in recovery.

The symptoms of the case I have described bear not a little resemblance to symptoms of disseminated cerebrospinal sclerosis. It is probable, therefore, that the pathological conditions are also similar. Westphal, who records several cases of a somewhat similar nature after small-pox and enteric fever (four after the former and one after the latter disease), compares the phenomena in his cases to those of that disease.[2] Landouzy, speaking of similar cases after enteric fever, says that the pathological conditions are probably similar, the only difference between "ces tremblements post-typhoïdes et la sclérose en plaques classique, c'est que, dans le premier cas les altérations nerveuses paraissent, à en juger par la marche de choses, superficielles et passagères, tandis que, dans le second, elles sont profondes et persistantes."[3] He mentions, moreover, cases in which during life there appeared similar symptoms, and in which after death there were found "des foyers scléreux disséminés dans la moelle allongée et en particulier dans le noyau de l'hypoglosse"[4]

Conclusion.—The relation of the acute febrile diseases to disorders of the nervous system has of late had considerable attention drawn to it, but fuller investigation is still needed to enable us to acquire a knowledge of the character of this relation. I have therefore thought it not altogether useless to bring together some facts and observations regarding this relation in the case of scarlet fever. My paper is thus, to a considerable extent, a *résumé*, although a very incomplete one, of previous observations. To render it more complete I append a list of such references to the subject which I have been able to find.

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[1] *Med. Times and Gazette*, February, 1868.

[2] "Ueber eine Affection des Nervensystems nach Pocken und Typhus," Von Prof. C. Westphal, *Archiv für Psychiatrie*, iii. bd. 2 h.

[3] Landouzy, *loc. cit.* p. 141.

[4] *Loc. cit.* p. 139. Several cases of disseminated sclerosis after acute febrile diseases are enumerated by Bourneville in "Charcot's Lectures on the Nervous System" (*N. Syd. Soc. Trans.* vol. i. p. 219); cases are also recorded by Wilson (after Hooping Cough, *B. M. J.* 1876, ii. p. 675), and others.

In conclusion, I have to express my thanks to Dr. Collie for permission to narrate the history of the cases treated in Homerton Fever Hospital, and to Dr. Twining for aid in the preparation of this paper.

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THE THERAPEUTIC USES OF THE HERBA PULSATILLÆ.

"Anemone Pratensis" and "Anemone Pulsatilla" (Ranunculaceæ).

BY LEWIS SHAPTER, B.A., M.D. CANTAB.,

Physician to the Devon and Exeter Hospital and to the West of England Institution for the Deaf and Dumb.

The flowering plants of Anemone Pulsatilla and Anemone Pratensis were long since recognised and used remedially in medicine; but their temporary disuse is probably mainly to be ascribed to the indiscriminate manner in which they were given and to the want of any detailed explanation of their probable therapeutic action.

The history of the drug has its interest as showing the reputation which it at one time possessed.

Dr. William Cullen, in his *Treatise on the Materia Medica*, 1789, vol. ii. refers in the following manner to the use of Pulsatilla Nigricans:—

"This is one of the remedies which we owe to the benevolent industry of Baron Störck; but he has ascribed to it so many wonderful effects that his credit is hurt with many persons, and has made many neglect to give this remedy a frequent and fair trial. It has particularly concurred with this in Scotland, that the plant is not a native of this country, and that there has not been ready access to it. But whatever may become of the credit of Baron Störck's experiments, I must observe that the plant is an acrid substance, and therefore capable of being active, and from the singular matter resembling Camphire which water distilled from it contains, it may have peculiar powers and virtues.

"I would still recommend it to the attention of my countrymen, and particularly to a repetition of trials in that disease so frequently otherwise incurable, the amaurosis. The negative experiments of Bergius and others are not sufficient to discourage all trials, considering that the disease may depend upon different causes, some of which may yield to remedies, though others do not."

A further interesting note on the Meadow Anemone (Pratensis), occurs in the *United States Dispensatory* (Wood and Bache) for 1847 :—

"This plant," it is stated, "enjoyed at one time considerable credit from the recommendation of Störck, who believed that he had found it useful in amaurosis and other complaints of the eye, in secondary syphilis, and in cutaneous eruptions. The Anemone Pulsatilla, an analogous species, has been employed for similar purposes, and favourable reports have been made of its efficacy in obstinate diseases of the skin and in hooping cough. The preparation employed was an extract of the herbaceous part of the plant, which was given by Störck in the dose of one or two grains daily, gradually increased to twenty grains or more. In large doses it was frequently found to produce nausea and vomiting, or griping and looseness of the bowels, and sometimes acted as a diuretic. The species of anemone above mentioned are European plants, and are not cultivated in this country. We have several native species, which, however, are not employed. One of them, Anemone Nemorosa, which is common to Europe and the United States, is said to act as a poison to cattle, producing bloody urine and convulsions. It is stated also to have proved, when applied to the head, a speedy cure for tinea capitis. Most of the species are, in a recent state, acrid and rubefacient, resembling, in this respect, other Ranunculaceæ. They contain a peculiar crystallizable principle named anemonin, which is converted into anemonic acid by the action of alkalies."

Orfila (*General System of Toxicology,* vol. ii. part i.) details a series of experiments and observations made with the Anemone Pulsatilla (wind-flower), and records as his opinion—

"1. That the Anemone Pulsatilla produces violent inflammation of the parts with which it comes in contact.

"2. That it is absorbed and carried into the circulation.

"3. 'That it appears to act by stupefying the nervous system.

"4. That it likewise probably exerts an irritating action on the lungs and stomach.

"5. That its deleterious principles reside in every part of the fresh plant.

"6. Lastly, that its effects are much less, and become null, on being dried."

Orfila further states that many other species of this kind are poisonous. Vicat has seen the extract of Anemone Pratensis produce, in the dose of two drachms, gnawings in the stomach. Bergius reports dimness of sight and swelling of eyelids from exposure to the vapour arising from the evaporation of the juice of the plant in forming an extract, and, according to Balliard, the decoction of Anemone Sylvestris has produced convulsions. Such animals too as browse on the young shoots of the Anemone Nemorosa (of the woods) experience weakness of the legs, trembling, and bloody stools, and die in the course of a few days; whilst the inhabitants of Kamtschatka make use of this plant to poison their arrows, and the wounds are most commonly fatal.

Binz (*Elements of Therapeutics*), in his account of Pulsatilla, describes it as containing a crystalline body, anemonin (Pulsatilla-camphor), a chemically indifferent substance, which in doses of 0·5—0·6 grammes causes death in rabbits; and also an acid. *The plant paralyses the medulla oblongata and spinal cord*, and excites irritation of the digestive tract and kidneys (Clarus). Its use is in catarrh of the air-passages complicated with spasmodic cough, and in various rheumatic and dyscrasic conditions. A tincture made from the fresh leaves is also much praised as a remedy in spasmodic amenorrhœa. Clarus further found anemonin in doses of ½ gr. to gr. j. useful in irritative cough, asthma, and hooping cough. Dr. Phillips has recommended the drug in discharges from mucous membranes of a muco-purulent character, and in subacute gastritis with depression of spirits; and Dr. James Tucker, of Chicago, has reported its utility in simple dysmenorrhœa, but more especially in headache the result of excessive mental application, when other remedies have failed.

It was mainly the observation of Clarus that the plant paralyses the medulla oblongata and spinal cord that led me to investigate the special use of the drug as a nervine sedative. This observation of Clarus is directly confirmed by that of Orfila, "That it appears to act by stupefying the nervous system;" but my object will rather be to show that in medicinal doses the drug exerts its primary and essential influence as a sedative upon the sympathetic or ganglionic nervous system, subduing those nervous conditions or neuroses which may be regarded as reflex in origin, and controlling those vascular and tissue disorders which, pathologically considered, are sympathetic neuroses. The tincture of the whole herb (and not of the root, which is probably the homœopathic preparation) is the form in which I have administered the drug; the strength of the tincture being two and a half ounces of the herb to one pound of spirit (or one in eight), and the dose has been from ♏v. (or preferably ♏x.) to ʒss.

The following are some selected illustrative cases typical of the class of disorders in which, from my observation, Pulsatilla will be found useful and curative:—

Case I.—Eclampsia (accidental and transitory epilepsy), following scarlet fever and nephritis.

T. S., aged 15. This boy had enjoyed good health as a farm labourer up to eighteen months ago, when he had scarlet fever followed by nephritis and uræmic convulsions, from which, however, he states that he recovered and returned to work. About nine months after this illness he became subject to fits, in which, from the statement of others, he became unconscious for a few minutes, and these attacks recurred about two or three times in the week. Latterly they have become more frequent, and for some weeks prior to admission they had recurred frequently during the day.

On admission to the Exeter Hospital on the 28th of May, 1880, the lad appeared to be very strong and muscular, with an intelligent type of countenance, and no apparent defect or malformation. The different organs and systems of the body were healthy, urine on examination was acid, free from albumen, and of a sp. gr. of 1,025.

On the day after admission there were five fits, each lasting about four minutes, and characterised by a precedent pallor of countenance, sudden unconsciousness, convulsive twitchings (more marked on the right side), lividity of countenance, protrusion of tongue, and subsequent but not prolonged stupor.

On the two subsequent days after admission there were four fits of a like character, and then ♏v. of tinct. of pulsatilla were ordered in water every three hours. The next day (1st of June) there were two fits; 2nd of June, one fit at 7 A.M.; 3rd, 4th, 5th, and 6th of June, no fit; 7th of June, three fits, dose of tinct. pulsatilla increased to ♏viij.; 8th of June, one fit; 9th of June, two fits, urine again examined and found normal. From the 10th to the 12th of June the number of fits occurring daily were either two or three, and then ♏x. of tinct. of pulsatilla were ordered. From the 13th to the 16th of June there were two days in which fits recurred, and the pulsatilla was again increased to ♏xv. every four hours. From this time the fits gradually subsided; from the 17th to the 21st no fit recurred. On the 22nd there was a slight attack of about a minute's duration, and the dose of pulsatilla was again increased to ♏xx.

For a month after this time the lad remained under observation in the hospital without any fit recurring, and was then discharged.

Case II.—Eclampsia, dental in origin.

Mary M., aged 22, general servant, had enjoyed fairly good health up to about three months since, when she became subject to occasional attacks of giddiness, which soon passed into convulsive fits, in which she lost consciousness. For a fortnight before admission she had been treated for these attacks, which occurred daily.

On admission to the Devon and Exeter Hospital in January of this year she appeared pale and anæmic, and on examination a soft systolic murmur was audible over the aorta and carotids. The fits from which she suffered did not seem to differ on investigation from true epilepsy; they were convulsive, of short duration, and accompanied with loss of consciousness, immobility of the pupils, distortion of the face, and foaming at the mouth.

The family history being good, and the epileptic attacks being recent in origin, or, according to Niemeyer, "acute" in character, and therefore eclamptic, the only exciting cause that could be discovered was a number of decayed teeth. These were ordered to be removed, and the following mixture was given, as latterly I have found the addition of chloroform (and preferably the tincture, as less sickening) a true adjuvant to the action of the pulsatilla :—

℞ Tinct. pulsatillæ herb. ♏xx.
Tinct. chloroform. co. ♏xx.
Aq. dist. ad ℥j.
Ter die inter cibos.

One month after admission the patient was discharged from the hospital as convalescent, but she remained under observation as an out-patient for a further period of three months, when she was discharged recovered, having been free from fits for nearly the whole of this time.

The only observation that might be made in this case is that the removal of the decayed teeth had more to do with the removal of the fits than the use of the medicine. This may be so far a just criticism, but the following is an almost identical case of dental eclampsia where the pulsatilla controlled the fits even after failure of bromide of potassium.

Case III.—This case, Edith W., aged 17, had been in the hospital before for the same kind of epileptiform attacks, but had only received some temporary relief. There was nothing to indicate that she was the subject of true epilepsy, but I told her that her decayed teeth were a probable source of her trouble and advised their removal. This she absolutely declined to submit to. For some time she was placed upon scruple doses of bromide of potassium three times a day, but without any very beneficial result. The bromide mixture was then altered for one of ♏xx. of tinct. pulsatilla. She has now been free from fits for two months, and is still taking the pulsatilla, but the cause in the form of decayed teeth still remains.

Case IV.—Uterine Eclampsia.

Mary B., aged 35, admitted into the Devon and Exeter Hospital October 28, 1881, a pale, delicate-looking woman of a nervous temperament, short in stature, and ill nourished. She had been under treatment for many years in different hospitals and institutions for what she described as a falling down of the womb, and constantly recurring fits in which she lost consciousness. Under medicinal treatment these fits usually subsided for a time, but they invariably recurred, and she had never been successfully fitted with a uterine support. The fits under observation were epileptic in character, and an examination of the womb revealed prolapse of the anterior wall of the vagina rather than any prolapse of the womb, but the body of the womb was also slightly flexed anteriorly. Tinct. pulsatilla, ♏xx., was at first ordered every four hours, and three weeks after admission, there having been no fit for ten days, a cradle pessary of small size was fitted for the womb, and ♏xx. of tinct. chloroformi co. was added to each dose of the pulsatilla mixture for the relief of some abdominal griping pain. The improvement in this case continued without intermission. Two months from the date of admission there had been no fit for six weeks, and Ferri Redacti gr. j. was ordered daily after meals in addition to the other medicine. She was then discharged; but about three months subsequently came up to report herself as well, having recurred only for a short time to the former mixture, and being able to manage the pessary herself without inconvenience.

Class of Sympathetic Neuroses, seated in the Ganglia of the Sympathetic System: Trophesiæ.

Case V.—Cardialgia, functional palpitation, throbbing of vessels, heat, and flushings (Erythema Evanidum).

G. A., aged 17, a labourer. On admission to the Devon and Exeter Hospital the lad was mainly suffering from perceptible throbbing of vessels, turbulent palpitation of the heart, and giddiness, with slight attacks of fainting. Upon speaking to him an extreme nervousness appeared to come over him, so that he could hardly collect himself to answer questions; the face was flushed, and the whole surface of the body was covered with a remarkable diffused redness almost like a scarlatinal rash (Æstus Volaticus). This, after a time, passed off; but if he was standing up the slightest exciting cause would in addition temporarily bring on a dizziness or faintness. Up to six months prior to admission this lad had enjoyed good health, and from his appearance one would say in health that he must have been strong, muscular, and well-developed, and a good type of a Devonshire farm labourer. His illness, however, commenced with tendencies to pain in the front of the chest, occasional attacks of vertigo, and occasional flushings of the face and surface, with palpitation of the heart. All these symptoms, together with extreme nervousness, gradually increased upon him until he became unable to work.

Upon examination the report is, " A turbulent systolic impulse diffused over the whole cardiac area, no perceptible increase of dulness, and apex-beat apparently in normal position, a fugitive systolic murmur audible at the immediate apex, and a systolic murmur audible also in the carotid vessels. Pulse variable, generally about ninety per minute, full but compressible. The stomach and bowels appeared distended and tympanitic, and there was tendency to a feeling of pain, load, and discomfort about two hours after meals. Urine, sp. gr. 1,012 ; no albumen."

The treatment in this case consisted of almost the whole round of tonics, antispasmodics, and sedatives, together with remedies directed to indigestion and constipation. Courses of tinct. digitalis, of bromide of potassium, of liq. arsenicalis, of pepsin, of assafœtida, of ether, of ammonia and lavender, of alkaline mixtures with rhubarb, &c., had really no material effect. The bromide had the remarkable result of even increasing the vertigo and faintness, possibly from these being really anæmic in origin; and it was only three months after admission that the tinct. of pulsatilla was given, ♏v. every four hours.

At my next visit he expressed himself as for the first time relieved and stronger; the dose was then increased to ♏x., and subsequently to ♏xv., but this induced nausea and sickness, so that ♏x. was the dose which was continued uninterruptedly. Improvement was markedly progressive, but gradual, and on leaving the hospital after a course of the pulsatilla for six weeks, all tendency to vertigo and faintness had passed off, the slight evidence of heart mischief had cleared up, and he was daily becoming less nervous and excitable. He remained under observation as an out-patient, still continuing the pulsatilla, and at the end of three months was discharged recovered, having for some weeks previously omitted his medicine, although doing his usual work.

Case VI.—Vascular Turgescence of Thyroid, Amenorrhœa, Anæmia.

Alice H., aged 20. On admission to the hospital as an out-patient in June, 1881, this patient appeared pale and anæmic, and had complained for the last five months of amenorrhœa, almost coincidently with which there had been a gradually increasing swelling of the thyroid gland of the neck, for which immediate cause she had come for treatment.

The swelling of the thyroid gland was fairly uniform and yielding to palpation, and the enlargement almost invariably became more marked at the times when, indicated by some pains about the back, &c., the menstrual periods should ordinarily recur. Beyond a hæmic bruit in the neck there was no other indication of disorder, and she was ordered ♏x. of tinct. pulsatilla in water three times a day between meals, and the pil. aloes et myrrhæ every other night.

This case remained under observation for some time, making steady but gradual progress, and on the 16th of July the note is as follows:—"Menstrual period returned last week, no accompanying increase of swelling in the neck, expresses herself as feeling better, and looks healthier and ruddier in face." The pulsatilla was continued until the swelling of the thyroid gland had almost disappeared, when she was ordered, at the end of two months, pills of reduced iron, and was ultimately discharged recovered.

SYMPATHETIC NEUROSES: ÆSTHESIÆ.

Case VII.—Facial Neuralgia.

Jane B., aged 19, servant, was admitted into the hospital for obstinate facial neuralgia of some months' duration. During the last six months she had had as many as seventeen teeth removed, some for overcrowding and some for decay, and had tried a variety of medicinal remedies without any avail. She was now sent into the hospital with the view of some surgical interference for necrosis of the lower jaw; but as my surgical colleague at the time, the late Mr. Roper, did not think any interference called for, the case was transferred to my care. The account she gave me of her illness was that it began with ordinary toothache, for which a tooth had been removed, but her neuralgic attacks intensified rather than diminished, notwithstanding removal of teeth and treatment. Upon careful inquiry the neuralgic attacks appeared usually to recur at night and were preceded by coronal headache and heat and throbbing of head. The only evidence of local mischief connected with the mouth was some thickening of the lower jaw, corresponding to the second right lower molar tooth.

She was at first placed upon the croton chloral hydrat, in doses of gr. iij. every four hours, and subsequently upon large doses of bromide, together with chloral, opium, and other sedatives at night, but without any avail. A month after admission, 26th of July, there being no material change in her condition, ♏x. of the tinct. pulsatilla was ordered every four hours, the chloral draught to be given at night if required. At the next visit, 29th of July, she described the new mixture as having relieved the burning sensation in the head, there had been only one attack of neuralgia since commencing the mixture, and this was the day after it was begun. The chloral draught which had been ordered for emergency had not been needed. Ten days after this note, there having been no recurrence of attacks, she was made an out-patient, and continued under observation until the 17th of September, when she was discharged recovered, having discontinued the pulsatilla for a time.

In addition to the cases recorded, there are a number of others in which the use of pulsatilla has proved either curative or beneficial, but any detailed account is probably unnecessary. Feverish attacks, *e.g.*, are not uncommon prior or subsequent to the menstrual periods in young women of a nervous temperament; these attacks, nervous in origin, are controlled by pulsatilla. A transitory nervous fever is often witnessed as the result of continued nervous anxiety or shock, or overwork; this is subdued by pulsatilla. "Epilepsy and Eclampsia are," according to Trousseau, "two identical neuroses with regard to their symptomatic expression and their proximate cause." Pulsatilla is an adjuvant to the use of bromide in the former, and it is preventive of the latter. Neuralgic dysmenorrhœa is markedly benefited by the combined use of pulsatilla and bromide. Palpitation of the heart also will be relieved if it is sympathetic or ganglionic in origin. The local causes of neuroses, it will be remembered, are of two kinds, according as the nerve-centre is involved or not. In the former case with reaction on the nerve-centre, the functions of that centre to either (1) transfer, (2) diffuse, or (3) reflect impressions, are brought into play; but in the latter, on the contrary, the cause of pain, as well as the pain itself, is localized. Diffused dental neuralgia from a single decayed tooth, or transferred pain in the knee arising primarily from disease of the hip, may be taken as examples of the one; rheumatic neuritis of the sciatic nerve as an example of the other.

The true position, then, of pulsatilla as a remedial agent appears to be that of acting upon and controlling irritability and hyper-activity of the ganglionic nervous system; but it has no place, except indirectly, as a vascular sedative to be classed with aconite and hellebore. Upon this view, eclampsia, dependent upon an exciting cause acting reflexly, will be controlled, but true idiopathic epilepsy, or chorea, will not be allayed. Vascular excitement reflexly dependent upon some exciting cause, as in hay fever, will be mitigated or even cured; but in inflammation or inactive and passive congestive states it will be found useless.

If, therefore, pulsatilla appears, by its therapeutic properties, to calm that ever-variable class of cases which may be comprehensively termed the sympathetic neuroses in their pathological causation, it is surely worthy of more extensive investigation; and the object of this paper is attained if it tends to direct investigation into some reliable channel. A few words more need only be added as to the mode of prescribing the drug. The tincture of the herb of pulsatilla should always be expressly ordered of the strength of one in eight. The time for administration is an hour or so before food. I have usually prescribed it in doses of from ♏x. to ʒss. in distilled water only, but latterly I have had reason to think that the addition of the tinct. chloroform. comp. in ♏xx. doses assists the action of the pulsatilla. I also regard pulsatilla as an adjuvant to bromide of potassium.

Reviews.

Materia Medica and Therapeutics (Inorganic Substances). By CHARLES D. F. PHILLIPS, M.D. London: J. and A. Churchill. 1882.

DR. PHILLIPS has produced an excellent handbook on the inorganic substances of the materia medica, and one which will be useful both to the busy practitioner and to the medical student. The effects of each remedy are discussed under the following heads: (i.) Mode of absorption and elimination; (ii.) Physiological action; (iii.) Therapeutical action; (iv.) Preparations and doses. While carefully epitomising the statements and opinions of other investigators, the author has drawn very largely upon his own practical experience and the results of his observations. The number of references to other authorities is in many parts a drawback to the readableness of the book. Not unfrequently do we find in every second or third line the title and page of some work interpolated in the text, instead of being appended in a foot note. In any future edition the adoption of the latter plan would be a marked improvement. The work contains some very useful observations on the various mineral waters and baths, together with a brief account of the principal European spas.

In his preface Dr. Phillips says, "I have devoted more space than is usual to pharmaceutical chemistry: this will be to the advantage, I am sure, of the student, and, I trust, of the practitioner." If we are ever to gain more exact knowledge as to the mode of handling our remedies, this, as it appears to us, is a distinct step in the right direction. Not a great many years ago Sir Thomas Watson said, "To me it has been a life-long wonder how vaguely, how ignorantly, and how rashly, drugs are often prescribed"; and though great improvement has taken place in recent years in this respect, there is yet room for much amendment. The conclusions reached and the bearings of facts gathered from the physiological action of medicines are still rather vague and undefined, and empiricism, valuable as it is, only too often leads to disaster. We want more knowledge of the action of drugs on the bodily organs; and how can this be gained unless the chemical changes which are induced by them are more fully appreciated,—unless we know how the tissues are modified in their composition by disease, and how such changes are rectified by the agents employed? If works such as Dr. Phillips's induce the practitioner to extend his chemical knowledge instead of laying it aside when he leaves the schools, as is too frequently the case, a most powerful impetus will have been given to the advancement of rational, as distinguished from empirical, therapeutics.

Consumption: a Reinvestigation of its Causes. By C. W. De Lacy Evans, M.R.C.S. Eng. Author of *How to Prolong Life.* 12mo, pp. 78. London: Baillière, Tindall, and Cox. 1881.

This work is dedicated to "Parallax," founder of the modern Zetetic Philosophy and upholder of the theory that the earth is flat, to whom the author is indebted for the primary idea contained therein. Consumption arises chiefly from an excessive action of atmospheric oxygen. Fibrin is an oxide of albumen, and gelatin is an oxide of fibrin. Excessive oxidation of the albuminous parts of the body converts them successively into these two oxides. Hence substance is lost, the blood thickened, and the temperature raised, in phthisis. Thickened blood needs more power to propel it, hence the increased frequency of the pulse. Deposits of fibrin and gelatin give rise to tuberculous deposits. Diminished excretion of urea in phthisis is not due to defective oxidation, but to the fact that some part of the urea produced is transformed into acetic and formic acid, giving rise to unpleasant perspiration and offensive smell of the feet. Increase of phosphates in the urine is due to the increased oxidation of nerve-tissue, especially of the sympathetic nerve, hence the loss of control over the capillaries and the resultant sweating. Mind has a certain control over the sympathetic: in sleep this is absent; hence the night-sweats. A similar action produces diarrhœa (which by the way we have not observed to be worse during sleep). Everything is thus satisfactorily accounted for.

The germ-theory of disease is but the "fascination of error." The different forms of animalculæ found in disease are simply different forms of pre-existing blood-cells, each one of which even in health is a living germ or being. The cheese-mite and the itch-insect are in like manner developed from existing cells in the cheese and in the body. Bacteria and micrococci are changed blood-cells: they are effects, not causes of disease.

Tubercle may be caused by vaccination. Vaccine matter being a product of oxidation of the tissues often causes consumptive diseases. Jenner inoculated most of the members of his family with swine-pox and cow-pox matter, and "these all died of consumption."

Mountain air is good for consumptives because it is dry, and so its oxygen cannot exert its decomposing and destroying power: also because the sun's rays have increased power, and they are preservative. In the Andes another factor enters: sulphurous fumes are given out by the volcanoes, these take up the oxygen of the air and keep it so much employed that it cannot work mischief on the patient. A like explanation applies to the freedom of malarial districts from phthisis. Marshy places give off carburetted hydrogen and phosphuretted hydrogen which contain *no oxygen* but displace the oxygen of the air and so banish the baleful element. The Mediterranean is wholesome, because according to Carpenter its waters contain *less free oxygen* than the ocean generally. The editor of *Earth Life* has pronounced that "to those well advanced in chemical and meteorological science it is known that the proportion of oxygen in the air we breathe is gradually increasing." This to a great extent explains the fact that phthisical diseases are also increasing.

The best diet for consumptives may be selected from uncooked albumen (if phosphorescent all the better), raw or very underdone meat, solid fats and fruits.

Most of the remedies which have any efficacy can be shown to act by shielding the system from oxidation. Those which have no such action are worthless. The best remedy is free phosphorus in aqueous solution as produced by distillation: this solution is the discovery of the editor of *Earth Life*. The generation of nitrogen would undoubtedly have a good effect by decreasing the percentage of oxygen in the air: strong-smelling plants and flowers are good for the same reason. The author in conclusion philosophises (? zetetically) to this effect:—"A sound and recognised basis is required for the treatment of disease. It must be one so simple, true, and consistent with natural phenomena, that its contradiction would be impossible. If such a basis were recognised no one need be hampered by the presence of pre-existing and often erroneous theories: inventive literary genius would not be called into requisition." Such a basis for the theory of consumption is this view "that the wasting and destroying action of oxygen is in excess." If it be asked, "Why are some individuals more prone to undergo excessive oxidation than others?—we refuse to speculate or theorise on the question." It is a pity the author did not take this wise resolution earlier than on the last page. "Inventive literary genius," and little else, have gone to the making of this book. It is an affair of words, not of things, from beginning to end, like the philosophy of its patron. The properties of albumen and protoplasm are not necessarily all known when we give them a name, and text-books and dictionaries are poor sources from whence to draw complex inferences that shall be found true to nature. A little more observation and experiment, a little less of syllogism and verbal argument, would better repay the author's pains.

The Structural Anatomy of the Female Pelvic Floor. By David Berry Hart, M.D., F.R.C.P.E. Edinburgh: Maclachlan and Stewart. 1880.

The Relations of the Abdominal and Pelvic Organs in the Female. Illustrated by a full-sized chromo-lithograph of the section of a cadaver frozen in the genu-pectoral position, &c. By Professor A. R. Simpson and Dr. David Berry Hart. Edinburgh and London: W. and A. K. Johnston. 1881.

These are laborious and valuable works, dealing with a subject about which there is much talk and little knowledge.

In the first, the author attempts a rational mechanical description of the pelvic floor. According to him it consists of a pubic and a sacral segment—the former including all the soft structures from the symphysis to the lumen of the vagina, the latter including those posterior to that line; the pubic portion is movable, the sacral comparatively fixed;—the pubic portion is drawn up during labour, the sacral portion driven down; the pubic portion is driven down in prolapsus uteri, the sacral portion (except the posterior vaginal wall) is never so driven down; the pubic portion passes down with the viscera in the genu-pectoral position when the vagina is distended with air, the sacral portion remains in position.

There are three vertical lines of cleavage. [1. Vaginal, between the vaginal walls. 2. Recto-vaginal, between posterior wall of vagina and anterior wall of rectum. 3. Rectal, in the lumen of the rectum.

It is a little unfortunate that the subject of Plate 1, on which so much is founded, should have suffered from pelvic inflammation in the region of the right sacro-uterine ligament; the organs are inevitably displaced.

The matters considered embrace the changes that take place during parturition; in the genu-pectoral position; during the production of prolapsus uteri; during the process of hauling down the uterus with instruments: the principles of bimanual exploration, exploration with the speculum, and support by pessaries.

In some of his conclusions we are unable to agree with the author, though we admire his good honest work. Many points are enunciated with force and clearness, and we quite agree with him that "prolapsus uteri is really a hernia," but should have liked to see him add that all displacements which are of consequence are hernial also, and that only such as are of this nature require treatment.

In a dry study such as this, all inaccuracy of diction should be carefully avoided as much as in the proof of a mathematical theorem, and this is not always the case in the works before us. One or two of the figures are diagrammatic without being plain.

The chromo-lithograph in the second work is apparently open to the criticism that the position is genu-facial rather than genu-pectoral; but the so-called genu-pectoral position is not really genu-pectoral as far as the planes and angles of inclination of the body are concerned, for a pillow is always beneath the shoulders, raising them to a height closely approaching that in the picture before us.

We cannot end without a few words on the author's violent condemnation of all specula but the Sims speculum, Fergusson and Cusco not escaping. In spite of the fact that the Fergusson speculum "ignores the structural anatomy of the pelvis," it still remains the most useful speculum for the use of the eyes, giving twice as much light as any other. Splits of the cervix may be discovered otherwise, and operative interference (for which it is not suitable) is not everything. We wonder how far Dr. Berry Hart will agree with us that, in the present state of Gynæcology, where boundless uncertainty of knowledge is combined with boundless confidence in interference, a speculum which facilitated investigation while it absolutely precluded treatment might be a desideratum. We commend this hint to the numerous gentlemen who invent instruments.

Practical Exercises in Physiology. By J. Burdon Sanderson, M.D., LL.D., F.R.S., Professor of Physiology in University College, London. 8vo. Pp. 75. London: H. K. Lewis. 1882.

This book, of the modest number of seventy-five pages, contains a surprising amount of information about the ways and means of modern physiology. It has been drawn up to aid students of University College, but it might with profit be used by all who care to make themselves acquainted with some of the fundamental experiments on which physiology rests. Part I. is much the best. The chapter on "Muscle and Nerve" is excellent; without being overloaded by detail, it gives those small points without which a beginner so completely loses himself. The chapters on "The Frog's Heart," on "Spinal and Reflex Centres," on "Sensation and Perception," are also good.

Part II. consists of an account of demonstrations actually given. From the nature of the case, probably, it resembles an extract from a text-book, rather than an account of how to make observations.

Part III. on "Physiological Chemistry for Elementary Students" is less satisfactory for those who would work by themselves, since the detail is too meagre. Some of the methods, moreover, are not very good; that, for instance, of detecting sugar in a fluid by Trommer's test would almost certainly fail in the hands of a beginner if a *small* quantity only of sugar were present in the fluid.

The gaps in Part III. are largely supplied by Part IV., but not sufficiently to make it altogether satisfactory to students out of reach of help. Thus, a "portion" of the gastric mucous membrane is directed to be warmed "with 2 p. c. hydrochloric acid." In this, and other similar cases, a little more information about the quantities to be used would make the book more generally useful. On the whole, however, the directions given in the part are good.

The Pathology and Treatment of Acute Rheumatism. By ALEXANDER HARKIN, M.D. 8vo., pp. 20. Dublin: Printed for the author by John Falconer.

DR. HARKIN considers that rheumatism is due to trophic changes starting in the nervous system, and his treatment is to apply a blister over the cardiac region, with cotton wool over the joints. Even when there is no cardiac mischief this treatment is found to relieve the pains in the joints and quickly to cure the patient, without any internal remedy whatever.

Essentials of Chemistry. By R. A. WITTHAUS, A.M., M.D. Small 8vo. Pp. 257. New York: Wm. Wood and Co.

THE changes that have taken place in chemistry within recent years are so great that it has become almost a new science, and those who learned chemistry under the old notation have great difficulty in understanding the new. This little volume is a series of questions and answers regarding the points in chemistry most essential to medical men and students. These are very well and clearly drawn up, and although open to the same objection as other books of its size, viz., that it is very imperfect, yet it will be very useful for the purpose we have mentioned, as well as for enabling students learning chemistry for the first time to put their ideas clearly and definitely.

Clinic of the Month.

Cardiac Changes in Renal Disease.—M. J. Straus has recently performed a series of experiments on guinea-pigs which tend to show that cardiac hypertrophy in chronic nephritis results from the renal disease, as stated by Bright and Traube, and not from a general arterio-capillary thickening of which the changes in the kidney form only a comparatively insignificant part as taught (with modifications in details) by Gull and Sutton, Johnson, and others. Twenty experiments were performed. The plan adopted was to ligature one ureter through an abdominal incision, the other remaining untied. Antiseptics were used, and the wound healed by first intention without suppuration of the kidney or ureter. After five or six months the subjects of experiment were killed and their organs examined. In all the ligatured kidney was much atrophied, the other hypertrophied and nearly double the normal weight; the heart was hypertrophied, the change beginning in the left ventricle. Most of the animals experimented on were young, and all alike showed the cardiac hypertrophy well marked. M. Straus therefore cannot agree with MM. Gravitz and Israel, who state that in young subjects heart-hypertrophy is defective. Nor has he found an inverse, but, on the contrary, a direct proportion between the renal overgrowth and that of the heart consequent upon it. In one set of experiments it appeared that after ligature of one ureter the heart hypertrophied sufficiently to exceed in weight that of healthy guinea-pigs that had exceeded in body-weight by nearly a fourth the animals experimented on. The conclusions suggested by these experiments were confirmed by the post-mortem appearances observed in two patients who died of uterine cancer under M. Straus' care. Cancerous growth obstructed the ureters in both, causing the dilatation of these and the pelves of the kidneys, as well as diffuse nephritis. The left ventricle in both cases was hypertrophied though no other form of heart-disease existed.

Dr. Saundby quotes two cases as illustrating a statement made by him that valvular heart-disease, especially mitral stenosis of not an extreme degree may often be latent for a long time from its commencement, and suddenly give rise to serious symptoms on the supervention of renal disease (chronic Bright's disease). In the first case, one of mitral regurgitation in which the heart-lesion was believed to be due to rheumatic fever occurring forty-three years before cardiac failure took place, the patient had suffered no distress until the end of that period, when he began to micturate rather frequently at night, and the urine was found to be albuminous. The usual signs of failing heart-power then quickly followed. The second case was one of mitral and tricuspid stenosis, also of rheumatic origin, and the heart did not give way for twenty years after the rheumatic attack, and then only on the advent of renal symptoms. Dr. Saundby holds that the kidney-affection in such cases is not usually the result of passive congestion as believed by Dr. Dickinson, only a third of whose cases, he states, show the connection between granular kidney and valvular disease, and that third may include examples of the slight and unimportant interstitial deposit common in elderly life (Mahomed, Gull and Sutton). He also considers the fibrous thickening of cyanotic kidney to be essentially different from chronic interstitial nephritis. He agrees with Christison that frequent nocturnal micturition indicates very commonly the beginning of the latter lesion. Whatever its cause, he assigns to granular kidney a very important place as determining the issue of valvular heart-disease. (*The Lancet*, Jan. 21, 1882.)

The Nerve-Element in Whooping Cough.—Of late years the profession has bestowed very little, if any, serious scientific attention on some of the commonest of common maladies. Whooping-cough is conspicuously among the neglected ills to which, notwithstanding the forgetfulness of the multitude of earnest clinical investigators, flesh is still heir. Many years ago the nerve-element in this troublesome and too often evil-working, if not in itself dangerous, affection, engaged much consideration, and treatment was specially directed to its relief. It would be well if the investigation of this feature of the etiology of the affection could be resumed. The fact that pertussis belongs to the class of maladies which are communicable and "catching" does not take it out of the range of probability that the specific action of a morbific poison on the nerve centres may be the efficient cause of the disease. Although the fact that the affection occurs rarely more than once in the life of any individual may seem to point more directly to the fertilising of latent germs in the organism than to any special excitation of the nerve-centres, we do not, as yet, know enough of the *modus operandi* of morbific influences—"germs," or poisons as we call them—in the blood and the tissues to define the part which the nerve-centres play in the production of morbid phenomena. In any case, such relief is frequently obtained even in the earliest stages of whooping-cough from mild periodic counter-irritation over the whole length of the spinal column by a mustard-poultice, which merely reddens the skin without vesication, that it would be well worth while to study this method closely from the therapeutic as well as the clinical standpoint. It certainly does good; but how? In cases where the mustard poultice, applied for six or eight minutes—not longer—over the whole length of the spine immediately before putting the child to bed every night, for a week, or, in seriously spasmodic cases, a fortnight, does not procure a permanent amelioration of the cough, the effect of this remedy is enhanced by sponging the spine with iced water quickly each successive morning. In cases where the paroxysms of cough seem to be repeated and to continue from sheer exhaustion of the nerve centres, coffee, administered as a drink, will often stimulate the energy of the centres so as to put an end to the malady. These are practical points which require theoretical explanation. (*The Lancet,* Jan. 28, 1882.)

Simple Treatment of Congenital Club-foot.—It is unfortunate that so much of mystery and specialism hangs about the treatment of club-foot. It is too generally thought that it consists solely in tenotomies and the application of complicated and expensive shoes of various kinds which none but the specially initiated can understand. And for this reason cases are often left untreated just when simple treatment would be most quickly successful. For club-foot, like every disease and deformity, is more amenable to treatment in its early uncomplicated stages, and many a case which in later years is cured only after long and wearisome treatment would have been comparatively easily dealt with in its earliest stages. The great objects to be attained in all cases of club-foot are to replace the part in its normal position with the help of tenotomy where necessary, to retain it in that position for a sufficient length of time, and to exercise and stimulate the development of the weakened muscles. This can all be done in congenital club-foot from the earliest days, and ought to be commenced at once. The hand is the proper instrument to correct the deformity, and a plaster-of-Paris splint just strong enough for its purpose is the best means of maintaining the foot in its proper place. This splint, if made after the Bavarian pattern, can be removed every day for the foot to be rubbed and electricity applied; or the more common form of plaster-of-Paris splint may be removed for the same purpose every two to four weeks. If practitioners would treat their cases of club-foot in this way from the very first, many would be almost if not quite cured before the child began to walk, when the difficulty of treatment is necessarily increased. (*Ib.*)

Alveolar Periostitis in Diabetes.—M. Magitot has just read a paper before the Paris Academy of Medicine which he sums up as follows :—(1.) The examination of the mouth affords an unfailing aid to the diagnosis of diabetes mellitus. (2.) The characteristic symptom is a line along the alveolar margin indicating an osteo-periostitis. (3.) This symptom appears at the very beginning of the malady and persists throughout its course. It may sometimes be the first to reveal the existence of the disease. (4.) The alveolar lesion gives rise in the first stage of the disease to a deviation of some of the teeth ; the next stage appears as alveolar catarrh and loosening of the teeth ; the last stage, in which the teeth drop out, is also the last stage of the disease. If the patient still survive, the alveoli next become absorbed and the gums partially gangrenous. This last sign is critical, and indicates the fatal issue of the diabetes.

Gaseous Gangrene in Wounds.—Dr. Daniel Molière gives a graphic account of this very deadly complication. He is able to distinguish it sharply from hospital gangrene, purulent infection, erysipelas, and septicæmia. Antiseptics seem as yet to have no effect in arresting its development. The characteristic symptoms are—(1.) Excessive pain in the neighbourhood of the point attacked. Patient is apt to think this due to too tight bandaging. The wound looks normal, and there is no swelling or tenderness. The temperature is normal. (2.) Some hours later breathing becomes hurried, expression anxious, speech interrupted. This premonitory dyspnœa is of essential value in the diagnosis. The temperature remains normal. (3.) Local phenomena now first appear, swelling and emphysematous crepitation is noted round the wound, its colour becomes deeper. The puffing-up spreads rapidly to a distance. (4.) The colour of the skin changes. Livid spots which turn violet, then green, spread on all sides. On incision gas escapes and an unhealthy scanty serum trickles out. The spots are insensitive, and may show crops of reddish pustules filled with gas. The temperature is however still normal. (5.) The dyspnœa increases, rarely there is slight delirium. The temperature now falls to 36°, or lower, limbs become cold, face cyanosed. Patient sinks with symptoms like those of a case of diphtheria. (6.) It is almost impossible to produce signs of intoxication in these cases even when large quantities of alcohol are administered. Dr. Molière regards the disease as situate in the cellular tissue, not in the blood as Maisonneuve thought. Before gas appears this tissue is œdematous and icteric in colour. The infiltrating serum coagulates as it cools. A large *bacillus* has been found in this liquid. The disease is inoculable. The gases developed are inflammable. It is possible that early and active measures might check the spreading of the gangrene, as cauterisation neutralises malignant pustule. (*Lyon Médical* and *Journ. de Méd. Paris*, Dec. 31, 1881.)

In later articles Dr. Molière gives the etiology of the disease as follows:—(1.) The primary cause *sine quâ non* is the development of a *bacillus* in the cellular tissue. (2.) The causes which prepare the soil for this *bacillus* are (i.) the severity of the original injury (producing shock). (ii.) The exhaustion of the patient before his wound (as in war). (iii.) The region wounded, and especially those where the cellular tissue is abundant (scrotum, breast). (iv.) Certain inflammatory diseases, œdema of the scrotum, and chiefly erysipelas. Though an ardent Listerian, the author acknowledges that in wounds of the scrotum and breast the Listerian dressings and especially the mackintosh tend to produce œdema and so predispose to gaseous gangrene. (*Lyon Méd.* Jan. 1882.)

The Treatment of Writer's Cramp.—Dr. Vigouroux publishes in the *Paris Médical* a case of this intractable affection which was successfully treated by the actual cautery. The first application took the form of three rows of cauterised points on the posterior surface of the forearm reaching from the elbow to the wrist. Relief was immediate, and three days afterwards the improvement was still marked. The operation was repeated at the end of a week and of a fortnight respectively. On the third occasion a row of points was marked out over the back of the hand and along the little finger, which had long been the seat of severe cramps and pains. Three other repetitions at intervals of three weeks resulted in a complete and unlooked-for cure. (*Le Praticien*, Dec. 19, 1881.)

Dr. Romain Vigouroux describes a method of treating writer's cramp practised with much success by Herr Wolff, a calligrapher of Frankfort. Two cases of an obstinate kind, treated under Prof. Charcot's supervision by various electrical methods without permanent benefit, were cured by way of demonstration after a fortnight of Wolff's treatment. The essentials of the method are gymnastics and massage of the affected muscles. The patient has to execute thrice a day a long series of abrupt movements of the arms and hands. The muscles are then extended and even put on the stretch by the operator or the patient himself, till fatigue overcomes the tendency to spasm. Massage, friction, and slapping are also persistently used, and writing movements practised so soon as the diminished cramp allows. It should be added that the treatment is painless. (*Le Progrès Médical*, Jan. 21, 1882.)

Ocular Symptoms in Tabes Dorsalis.—Dr. Sons has attempted to discover whether, given certain ocular symptoms such as asthenopia, diplopia, ophthalmoplegia single or multiple, &c., it is possible to predict that the patient will become ataxic. Such symptoms are either (1) dependent on changes in the optic nerve, or (2) produced by lesions of other nerves. Of the first class those which are apt to end in ataxy are—(*a.*) Gradual loss of sharpness of vision down to total blindness, this being unattended with ophthalmoscopic symptoms. (*b.*) The diminution of the field advancing by sectors, vision being normal in the region unattacked. This may result at a certain stage in total blindness over the external half of the field. (*c.*) The disc preserves its form but loses colour, becoming chalky-grey under a strong light, bluish under a weak light; its contours are regular, but the vessels may ultimately disappear. (*d.*) The perception of colour changes, especially as regards green and red. Of the second class the following combinations are held to be the most characteristic:—(*a.*) Transitory paralysis and spasms of the motor muscles, especially of those supplied by the third nerve; these may show themselves by transient strabismus, or diplopia. (*b.*) Myosis; insensitiveness of the pupil to light; it does not dilate in darkness, but does when distant objects are looked at and during attacks of lightning-pains.—Many of these symptoms are found connected with disseminated sclerosis. Certainty can of course only be reached by watching the further progress of the case. (*Jour. de Méd. de Bordeaux* and *de Paris*, Dec. 13, 1881.)

Sciatica.—Mr. Jonathan Hutchinson, in a clinical lecture on "sciatica," sums up his conclusions as follows:—In nineteen cases out of twenty in which the diagnosis of "sciatica" is suggested there is no affection of the sciatic nerve whatever. They are simply cases of arthritic disease of the hip in one or other of its various forms—acute gout, chronic gout, rheumatic gout, subacute rheumatism, or chronic senile rheumatism. Both by the public and the profession these cases are constantly called "sciatica." Our workhouse infirmaries are full of chronic cases under that name, and I speak advisedly when I say I feel sure that they are almost all examples of *morbus coxæ senilis*. Of the cases of "sciatica" which are not hip-joint rheumatism, some are probably affections of the fascia or periosteum near to the hip; a minority are possibly affections of the sciatic nerve itself. In these latter it is the sheath of the nerve which becomes painful. The pain may be darting, or may radiate, but it does not pass down the nerve-tubules or in any way make the patient conscious of their course. The diagnosis of true sciatica is to be based upon the discovery of tenderness restricted to the trunk of the nerve, and involving a considerable part of its course. Examples of this are decidedly rare, and their recognition without risk of error is a matter of great difficulty. (*Med. Times and Gazette,* Jan. 28, 1882.)

The Etiology of Scarlatina.—Dr. Eklund, of Stockholm, has for several years devoted much time to the study of the pathology and etiology of scarlatina, which is constantly present in the Swedish capital, and rarely absent from the barracks and other dwellings on the Isle of Skeppsholm. The results at which he has arrived cannot fail, if confirmed by other observers, to be of the highest practical importance as solving the connection, too frequently seen to be ignored or explained away, between bad drainage or other insanitary conditions and outbreaks of scarlatina, which otherwise must be admitted to have been produced spontaneously—*i.e.,* without actual infection. In the urine of persons suffering from scarlatina he has constantly found a prodigious number of discoid corpuscles, oval or round, their diameter being less than $\frac{1}{1000}$ millimetre, or from a thirtieth to a tenth of that of a red blood cell. They are colourless or yellowish-white, surrounded by a distinct cell-wall, and containing a well-defined nucleus of a deeper hue; sometimes one or more nucleoli may be seen. They exhibit rotatory or oscillatory movements, especially when a drop of water is added to the fluid. They multiply themselves, as he has frequently observed, by fission, first of the nucleolus, next of the nucleus, and finally of the entire cell. He cannot say whether they develop into a mycelium; at any rate, the presence of fine filaments seems to be exceptional. He has never seen them adhere in monoliform chains or massed as zooglœa. He considers them to be veritable *schizomycetes,* and proposes the name of *plax scindens.* But Dr. Eklund most positively asserts that he has found these identical organisms in vast numbers in the soil and ground-water of the Isle of Skeppsholm; in the mud from the trenches dug for the water-mains; and among the greenish moulds of the walls of the old barracks, where scarlatina was most rife. Nay more, he alleges cases of scarlatina occurring in children after drinking milk mixed with the ground-water of the island, and one case which followed on immersion in one of these trenches, and the drying of the child's clothes in a small room. In still another case scarlatina broke out in a block immediately on the exposure of the ground water by excavations around. Other observers have found micrococci in the animal fluids in scarlatina, but, even if they were shown to be invariably present in the disease, it would not prove that they were its cause. Still less can the connection of the extra-corporeal organisms with scarlatina be demonstrated by anything short of direct verification by inoculation into a healthy body carefully isolated from all other sources of infection. It is the absence of this last condition of scientific precision which casts a doubt on all conclusions drawn from accidental, or, as Mr. Simon would say, popular experiments. (*Med. Times and Gaz.* Jan. 28, 1882.)

Cure of Varicocele by Intravenous Injection of Chloral.—Dr. Angelo Negretto reports two cases of severe varicocele which he successfully treated by Porta's method. The first (left side) had existed for over two years, and was as large as a pigeon's egg, the diameter increasing on effort to 4½ centimetres. It caused severe pain and partial atrophy of the testicle. Four injections, each of half-a-gramme, of chloral hydrate were made with a Pravaz syringe at four several points into the covering of the varicocele. A slight grumous exudation from the punctures ensued, and on the following day some signs of orchitis. These were overcome by cold carbolised applications; and as the upper part of the tumour seemed unaffected, three more injections were practised there. In six days the patient was well, and the varicocele gone. It has not reappeared since. The other case (also left) had existed five years, and was larger and harder than the foregoing, owing probably to repeated attacks of phlebitis in the varicose veins. A slight degree of inflammation along the spermatic cord existing, the patient was first treated with lead lotion. Five injections of chloral hydrate (½ gramme) were administered as before, resulting in great diminution of the tumour. In a week three more injections were given, and the result, with some slight intercurrent inflammation, was complete and permanent cure. The various methods of treating varicocele are so numerous and so little satisfactory in many cases that a new and hopeful one is by no means unwelcome. This of Porta is not widely-enough known, though it has the decided merit of being less dangerous than many in current use. (*Gazetta Medica Italiana,* Jan. 7.)

Extracts from British and Foreign Journals.

Action of Alcohol on Digestion.—Buchner has made a series of experiments on this subject by adding alcohol to artificial digestive fluids in a flask, and also by washing out the stomach six hours after a meal, and ascertaining what proportion of the food remained undigested when alcohol had been given or not given along with the food. He finds that alcohol up to 10 per cent. strength has no influence as such upon artificial digestion. When added so as to form 20 p. c. of the digestive fluid it slows artificial digestion. In larger proportions it completely arrests it. Beer when undiluted completely stops artificial digestion, and when diluted slows the process. Red and sweet wines have a similar action, while white wines even when undiluted only slow digestion. Both beer and wine hinder digestion in the stomach even in small quantities. When the processes of absorption and secretion are already disturbed wine and beer may completely arrest digestion. They should therefore be given with the utmost caution or completely withheld in cases of gastric catarrh. (*Deutsch. Arch. f. Klin. Med. Bd.* xxix p. 537.)

Treatment of Acute Dysentery by Aconite.—Dr. Owen has tried ipecacuanha in dysentery and finds that the best dose is 25 grains. Even with this dose, however, vomiting will occur, and for this and other reasons he holds that aconite is preferable. He gives one minim of the tincture every quarter of an hour for two hours and one minim every hour afterwards. The sooner the patient is put under treatment the better. It is essential that the medicine should be taken regularly every hour and at night. Should the patient sleep he should be instructed to make up for lost time by taking a dose for every hour he has slept. The diet is just as important in these as in any other dysenteric cases. His cases got nothing but rice and milk, and a few milk only. If the last two points mentioned above be neglected, success in this treatment cannot be looked for.

Among the cases described, the duration of the aconite treatment varied from $12\frac{3}{4}$ days to 7 hours, and the average was 4·05 days.

When the disease was cured, the aconite was discontinued and the patients were then put on iron, which was continued for about three days. This gave an average number of days under treatment in the diarrhœa ward of 7·57. (*Indian Med. Gaz.* April 1, 1882.)

Benzoic Acid in Chyluria.—Dr. Roy finds that benzoic acid has caused chyluria to disappear in two days, and when a relapse occurred on withdrawing the medicine its re-administration caused the disease again to disappear. In a case reported by Assistant-Surgeon Mutterjee benzoic acid in ten-grain doses not having the desired effect and perchloride of iron alone also being useless, the two were given together with complete success. (*Indian Med. Gaz.* April 1, 1882.)

Position of the Stomach and the Relations of its Form and Function.—Professor Lesshaft of St. Petersburg has come to the conclusion that the stomach has a vertical position in the abdominal cavity. The fundus touches the diaphragm; the pyloric orifice looks towards the right; the lesser curvature also to the right, and at its upper part somewhat downwards; the greater curvature towards the left. It lies in the left hypochondrium and epigastrium, and the pyloric orifice lies in a line prolonged from the right border of the sternum. When the stomach is distended it cannot alter the position of any of its parts in consequence of its connection with neighbouring parts, but must dilate uniformly according to the extent to which it is filled. The muscular coat of the stomach consists of longitudinal, circular, and oblique fibres. The longitudinal fibres go from the fundus to the pylorus, the circular layer becomes thicker towards the pyloric orifice, and is most marked at the pyloric sphincter. The food introduced into the stomach is thus moved along the gastric walls towards the pylorus, so that it can be readily mixed with the gastric juice. It then returns along the middle line of the stomach back towards the fundus. The peripheral movement of the gastric contents from the fundus to the pylorus and its central return are only rendered possible by the peculiar form of the stomach. The absence of the fundus in newly-born children, and its appearance later can only be explained by the central ascending current of the gastric contents. The form of the stomach and the distribution of its muscles render the retention of food in the stomach easily comprehensible, and also the slight and gradual passage into the small intestine during the first part of the digestive process. When gas accumulates in the transverse colon it may rise upwards in a loop to the left of the stomach as far as the fourth intercostal space, or even to the fourth rib. When gas accumulates in the loops of the small intestine they rise upwards behind the transverse colon, and in such a case the lower part of the stomach may turn somewhat forwards and the organ may assume a more oblique position from above and behind downwards and forwards. Even when the stomach is large, and large quantities of food are taken at a time, it always retains the vertical position, and only the pyloric part turns upwards and to the right, where it becomes continuous with the duodenum. The spleen normally lies at the posterior and upper part of the greater curvature towards the middle of the fundus. It corresponds to the ninth intercostal space, or the tenth rib on the left side, beginning at the place where the axillary line intersects this intercostal space, and reaches with its upper end almost to the vertebral column. (*Virchow's Archiv.* vol. lxxxvii. p. 69.)

The Choice of Drainage Tubes.—M. Nicaise points out the importance of using non-irritant india-rubber drainage-tubes in the dressing of wounds. He gives the following directions.

The tube should be short and wide, and should not be in contact either with the bone or the ligature of the chief artery.

Tubes are grey, black, or red. They should be made from laminæ of pure caoutchouc cut with the saw, vulcanised, and desulphurised. Good tubes may be recognised by (1) the transverse markings left by the saw; (2) their lightness; they should float on water; (3) their strength; they should bear being tripled in length without breaking.

Bad tubes are made from sheets of paste made up with shreds of caoutchouc, zinc white, minium, &c. If grey they remain so after being dipped in an alkaline solution. Grey tubes have not been freed from sulphur, and this separates out and irritates the wound; they should be avoided. Red tubes which have been desulphurised by soaking three hours in a hot 10 per cent. solution of carbonate of soda may be safely used. Black tubes answering to the above tests are the best of all. (*Revue de Chirurgie*, Dec. 1881.)

Antiseptic Dusting Powder.—Dr. Klamann recommends the following powder as a means of healing and of preventing intertrigo in infants.

℞ Magnes. ust. subt. pulv.	5	grammes
Talci veneti pulv.	20	„
Acidi Salicyl.	0·2	„
(Mist. oleos. balsam.	10 minims).	

To this may be added alumen ustum when greater astringency is required, and the salicylic acid may be replaced by boracic acid. Dr. Klamann uses this in intertrigo, eczema, and erythema, and finds it to act rapidly and certainly. He has also applied it with good effect in eczema capitis, and to raw surfaces produced by blisters. (*Deutsche Med. Zeitung*, No. 48, 1881.)

Antiseptic Vaccine Lymph.—Pott has instituted a series of vaccination experiments, using lymph diluted with various antiseptics. These were, respectively, solutions of salicylic acid (1 : 300); boracic acid (3·5 : 100); and carbolic acid (1—5 : 100). The lymph was active in all the solutions except that containing 5 per cent. carbolic acid. No disadvantages of any kind were observed. As advantages Pott mentions that (1) the lymph is more fluid, and so more readily worked with; (2) it can, in all probability, be kept unspoiled for years; (3) if the lymph contain "erysipelas-poison," the antiseptic solution may probably neutralise it. This is of course assuming that a solution which does not affect the vaccine (micrococci?) is active enough to kill the erysipelas-germs. (*Jahrbuch f. Kinderheilkunde*, 1881, and *Schweizer Corresp. Blatt*, Dec. 1881.)

Parsley as an Antilactic.—Dr. Stanislas Martin, after observing that the use of mineral waters interrupted the secretion of milk, states that, as an external application, parsley-leaves act most efficaciously in dispersing it, and that they were used for this purpose by the Roman matrons of old. The breasts should be covered with freshly plucked leaves, and these should be renewed several times a day as fast as they begin to fade. The dispersion of the milk soon takes place. Dr. Dujardin-Beaumetz confirms Dr. Martin's statement, and adds that in Asia Minor parsley in the form of large cataplasms is used by the women as an ordinary domestic remedy. (*Bull. de Thérap.* July 30 and Aug. 30, 1881.)

Naphthalin as a New Antiseptic.—Dr. Fischer, Privat-Docent of Strasburg, strongly recommends (*Berliner Klinische Woch.*, November 28) naphthalin, ($C_{10}H_8$), as a most energetic and cheap antiseptic and "antibacteriticum." Urine exposed to a local naphthalin atmosphere will remain clear for a week, no minute organisms developing in it; while a fluid, on the surface of which fungus formations have occurred, ceases to produce these in a similar atmosphere. Offensive wounds and ulcers, on powdered naphthalin being sprinkled over them, in a very short time cease manifesting any bad odour. It produces no pain in the wound, is not absorbed by it, favours granulation, and does not excite eczema of the surrounding skin. Deep wounds, abscesses, &c., may be filled with it, just as is the case with iodoform, without any ill effect being produced. The naphthalin is insoluble in water, and by the secretions at the surface of wounds; but it is easily soluble in ether (one part to four), and this mixed with alcohol forms a suitable means of impregnating the materials for dressings, such as gauze, &c. In order to impregnate gauze with 10 per cent. of naphthalin, 100 parts of naphthalin, 400 of ether, and 1,200 of alcohol may be employed. The rapid evaporation of the ether and alcohol allows gauze which has only been prepared a short time before the visit to be at once applied; and the only objection to applying it while still wet is the unpleasantness of the cold produced by the evaporation. By means of the above mixture from thirty to forty metres of gauze may be impregnated at a cost of 1*s.* 9*d.*, the cost of naphthalin being 1*s.* 3*d.* per kilogramme; contrasting with the prices of some recently recommended antiseptics, such as iodoform at 30*s.* or 40*s.*, salicylic acid at 15*s.*, thymol at 50*s.*, resorcin at 50*s.*, chinolin at 60*s.*, &c. The easy miscibility of naphthalin with fatty matters, vaseline, &c., should render it, in the form of ointment, serviceable in diseases produced by vegetable or animal parasites. (*Med. Times and Gaz.* Dec. 31, 1881.)

Micrococci in Mumps.—MM. Cabitun and Charrin, at a recent meeting of the Biological Society of Paris, gave an account of the investigations which they have for some time been engaged in on the presence of minute organisms in the blood of persons suffering from mumps. These are multipliable by cultivation in Liebig's broth, and are found to consist of minute *batonnets*, but chiefly of micrococci all in a state of motion. These minute organisms, they consider, corroborate the clinical observations which tend to place mumps among the infectious diseases. The absolute proof that this disease is due to these minute bodies by reproducing it by inoculation of the cultivated forms has not been attained by the experiments made to that end. (*Gaz. Méd.* Dec. 17, 1881; *Med. Times*, Dec. 31, 1881.)

Mercury in Membranous Dysmenorrhœa.—Dr. Ormsby, of New York, gives five cases of painful menstruation, accompanied by the shedding of flakes of membrane, which were successfully treated with large doses of calomel in combination with opium. His formula is :—

℞ Ext. opii, gr. vj.
Hydrarg. chloridi mitis, gr. xij.

Divide into twelve pills, one to be given every four hours till the gums are affected. He regards the known efficacy of mercury in all forms of hyperplasia, acute and chronic, as justifying *a priori* its exhibition in a complaint in which the hyperplastic element is recognised by pathologists: and his practice has completely confirmed this view. In each case when the mercurial treatment has been pushed so as to make the gums slightly tender, the next following menstruation has been painless, and the benefit so attained has then been permanent without further medication. Painful menstruation is so much a question of habit, that to interrupt it for one month only is almost to break it off altogether. Calomel has been the only salt of mercury tried, as it produces its effect rapidly and with little irritation. (*New York Med. Rec.* Nov. 26, 1881.)

Nascent Iodide of Silver in the Treatment of Conjunctivitis.—According to Sédan (*Recueil d'Ophthalmologie,* May, 1881), M. Brame, of Tours, was among the first to advocate the use of iodide of silver in conjunctivitis. Dr. S. instituted a series of observations with this remedy in Algeria, where cases of chronic conjunctivitis are very numerous, and found it decidedly efficacious both as a prophylactic and in the cure of acute and chronic cases.

Two solutions are requisite for the manufacture of the nascent iodide. One of these is a solution of the iodide of potassium, 332 ctgr. in 10 grm. of distilled water. The other solution is composed of nitrate of silver, 356 ctgr. in 10 grm. of distilled water. Both solutions are preserved in bottles made of coloured glass. The nascent iodide of silver is prepared by dipping separate glass rods into either solution, withdrawing a drop of each and subsequently mingling them on a piece of porcelain. The resulting precipitate of nascent iodide is placed upon the everted lower lid, and thence allowed to diffuse itself over the entire conjunctiva. The iodide thus prepared dissolves very slowly in the ocular fluids, and produces much protracted pain. This inconvenience may be obviated by the employment of glycerine as the menstruum. The border of the lids should be anointed with vaseline to prevent them from becoming adherent. Dr. Sédan had constant, rapid, perfect, and permanent results in more than three hundred cases subjected to the treatment in question. He states that a single application will often cure simple cases, while in ninety-two out of one hundred cases, selected at random, less than four applications were necessary to effect a cure. (*New York Med. Rec.* Nov. 26, 1881.)

Use of Pilocarpine in Diphtheria.—Dr. J. Gerard's enthusiastic recommendation of pilocarpine in diphtheria would carry deeper conviction with it did it not bear evidences of too hasty generalisation. The author treated only one case of malignant diphtheria, in which the patient seemed moribund in spite of the employment of the ordinary remedies, with the following mixture :

R Pilocarpin. muriat.	·05	grammes.
Pepsin. extractiv.	1	„
Aquæ destil.	150	„
Acid. hydrochloric. gtt. iij.		

One-third of the mixture was at first given, and all the physiological effects of the pilocarpine having been speedily produced, violent emesis occurred (within eight minutes), by which the false membranes were expelled. Cyanosis then disappeared, and the respiration became normal. The same quantity of pilocarpine having been administered hourly, the child was considered out of danger after twenty-four hours.

M. Sueboullet (*Journal des Sciences Médic. de Louvain*) presented to the medical society of the hospitals a case in which the hypodermic administration of pilocarpine seemed greatly to favour expulsion of the pseudo-membranes, by the physiological hyper-secretion of saliva and mucus it induced. Recourse having been had, in a desperate case of malignant diphtheria in which asphyxia seemed imminent, to pilocarpine, two injections, each containing 5 milligr. of the nitrate, were employed in twenty-four hours. The resulting salivation was believed to hasten the expulsion of the membranes. On the two succeeding days three injections of ·015 each were exhibited, after which the remedy was discontinued. On the third day convalescence was begun, and a complete recovery made by the twentieth day. Professor Giulio Lepodi-Chioti (*ibid.*) publishes his personal observations made in the treatment of diphtheria with pilocarpine, by which he is led to the conclusion that the drug hastens the detachment of the false membranes and abbreviates the course of the disease. He also maintains that the abundant perspiration acts as a powerful emunctory agent, and eliminates the virus of the disease from the blood. The remedy was administered hypodermically and by the rectum. Small doses must be at first employed, owing to the susceptibility of many persons to the action of pilocarpine.

Le Lyon Médical publishes the case of a child six and a half years old, occurring in the practice of Dr. Cassin, of Avignon, in which similar fortunate results attended the use of pilocarpine in diphtheria. The formula employed was as follows:

R Pilocarpin. muriat.	·01	grammes.
Pepsin.	·02	,,
Aquæ destil.	120	,,
Acid. hydrochloric. gtt. j.		

One dessert-spoonful was given hourly, for two days. On the fourth day four doses only were exhibited and the remedy then suspended, convalescence being established. (*Archives Médicales Belges*, June, 1881).

Professor Prentiss (*Philadelphia Medical Times*, August 13, 1881), referring to the published cases of Guttman, Lax, and Wendt, says that, in the question under consideration, the preponderance of evidence seems to be in favour of pilocarpine. His own experience with the drug corroborates this view. He prefers, however, the hypodermic mode of administration, using one-sixth of a grain for a dose in adults. Children readily take the drug in the form of powder. Hydrochloric acid solutions, he thinks, are unnecessary, because they afford no special advantage over simpler ways of giving the medicine. (*New York Med. Rec.* Nov. 26, 1881.) [*Pract.* xxvi. 378, 461.]

Treatment of Facial Neuralgia.—*La Clinica de Malaga* recommends crystallised aconitia as a powerful, almost sovereign, remedy in idiopathic facial neuralgia. Where the complaint has its chief seat over the infra-orbital foramen, and exhibits at the same time decided periodicity in its recurrence, quinine, which is usually administered, has its effect much enhanced by the addition of aconitia. The combination acts certainly and rapidly. Formula:—

℞ Quiniæ sulphatis, 0·20 centigramme.
Aconitiæ nitratis crystall. 0·025 centigramme.
Pulveris cinchonæ, q.s.

To be given in the form of a pill, of which four or five may be taken in twenty-four hours, allowing at least four hours between each pill. (*Revista Med. Quir.* (Argentine Rep.), Aug. 1881.)

Chloralised Tincture of Iodine.—Cárlos Paves recommends the following preparation, which, from its power of instantaneously coagulating albumin, should be useful in the treatment of large ulcers. It acts both as an antiseptic and a hypnotic:—

Pure iodine, 20 grammes.
Hydrate of chloral, 30 grammes.
Alcohol (of 36°), 140 grammes.

Dissolve, filter, and keep in stoppered bottles. (*Gaceta Médica Catalana,* Nov. 1881.)

Therapeutical Uses of Yerba Santa.—Dr. Salomon reports that yerba santa, or *Eriodyction Californicum,* has in his hands proved to be a remedy of value in bronchorrhœa, in acute bronchitis, in the cough of measles, and as a prophylactic against laryngismus stridulus. Dr. Salomon employed the fluid extract of the leaves in doses of ten minims to one drachm, glycerine being the best vehicle, as water and syrups precipitate the gummy portion of the preparation. The author thinks the remedy acts specifically on the mucous membranes of the air-passages as an astringent. In chronic bronchitis he was compelled, in the majority of cases, to abandon its use, and administer other remedies. (*N. O. Med. and Surg. Journ.*, and *New York Med. Rec.* Dec. 24, 1881.)

Aerated Mixture for Nervous Vomiting:—

I. ℞ Potass. bicarbonatis, 5 grammes.
Potass. bromidi, 2 grammes.
Aquæ fontanæ, 60 grammes.

II. ℞ Acidi citrici, 4 grammes.
Syrupi simplicis, 40 grammes.
Aquæ fontanæ, 120 grammes.

Put first a teaspoonful of I. in a glass, add a teaspoonful of II., stir, and drink at once. The dose may be repeated every half-hour at first, then every hour. The formula represents the maximum quantity to be administered in the twenty-four hours. (*Journ. de Méd. Bordeaux*, March, 1881.)

Anæmic Murmurs over the Cardiac Region.—The genesis of these murmurs is still very obscure; their seat even is by no means clearly fixed. It is commonly said that they are produced in the pulmonary artery, and there alone; but they are often to be heard at the apex, and are at times louder there than over the pulmonary. At other times they have their maximum intensity over the mitral orifice. They are generally systolic, but cases are reported where they have been heard as diastolic. With respect to their pathogenesis the accredited opinion, held even by Trousseau, is that they are vascular and produced by the vibrations of the liquid vein traversing the *ostium pulmonare*. This latter is held to be in a state analogous to spasm dependent on the degree of anæmia. Lately, however, a demonstration has been attempted that such murmurs are extracardiac, or rather extravascular. Grancher says that they owe their rhythm to the heart, but their sonorousness to the lung. In other words, the blood-wave traversing the pulmonary artery communicates an impulsive shock to the lobe of lung which laps over the *conus*, and the contained stratum of air being thus set into vibration gives rise to the murmur heard. The hypothesis at least deserves consideration. (*Gaz. des Hôp.* June, 1881.)

Diagnostic Value of Albuminuria.—Bouchard observed that in examining an albuminous urine it is sometimes possible to make the coagulum retract by heating it, in other cases this cannot be done. Though the chemical cause of this phenomenon is unknown, he notes that the pathological conditions have a relation to its presence or absence. Whenever this retraction of the coagulum appears, we can pronounce that the origin of the albuminuria is either renal, vesical, or vaginal. In by far the greater number of cases where no retraction can be produced by heat, the albuminuria results from the destruction of blood-corpuscles or tissue-wear. To this class belong the albuminurias observed in lead and mercury-poisoning, where there is no concomitant renal lesion. These albuminurias, depending on the general state of the health, are transitory; while those symptomatic of renal lesion have a very different prognosis. The non-retractile transitory albumin is observed in typhoid, erysipelas, pneumonia, pleurisy, and occasionally in rheumatism; moreover, in certain grave cases of chlorosis, in diabetes saccharinus and insipidus, and in polysarcia. (*Presse Méd. Belge*, May, 1881.)

An Example Worthy of Imitation.—In the city of Brussels, whenever a birth is registered, the Registrar hands to the parent, gratuitously, a little pamphlet of five pages containing short and plain directions for the management of children. In Paris the mortality among infants is so enormous, that it is proposed to introduce a similar practice there. (*New York Med. Rec.* Dec. 24, 1881.)

Iodoform-Spray.—M. Dujardin-Beaumetz has for some time back used, in the form of spray, a solution of one part iodoform in 100 parts sulphuric ether. A fine regular layer of iodoform is thus obtained, which can be applied with ease to the most irregular surfaces, as for example to large ulcers at the back of the throat. He has applied it with success in certain cases of vaginismus depending on numerous little ulcerations of the vulva. In cases due to other causes the treatment has no effect. The method seems hopeful as a means of treating vaginitis. (*Journ. de Méd. Paris*, Dec. 10, 1881.)

Pruritus.—Doyon gives the following formula for pruritus:—

Milk of almonds, 500 grammes.
Corrosive sublimate, 0·25 grammes.
Ammonium chloride, 0·25 grammes.

Guyon uses a glycerine thus compounded:—

Glycerine of starch, 60 grammes.
Bismuth subnitrate, 5 grammes.
Zinc oxide, 5 grammes.

Delioux de Savignac this lotion:—

Infusion of mallow, 1 litre.
Cherry-laurel water (filtered), 50 grammes.
Borax, 10 grammes.

(*Journ. des Conn. Méd.* Oct. 20, 1881.)

Notes and Queries.

Burroughs' Hazeline.—This preparation is distilled from the fresh green bark of *Hamamelis virginica.* The utility of this preparation as a local application in irritable and inflamed piles, and in chronic varicose and eczematous ulcers, has been noticed in the *British Medical Journal* (*vide Practitioner*, vol. xxvii, p. 52). We have given it a tolerably extensive trial in hæmorrhage from the lungs, and have found it satisfactory. In several cases it arrested the bleeding, when ergot with digitalis had failed. In some cases, however, it failed, and the subsequent administration of a combination of digitalis and ergot succeeded.

Æsculap Water.—This water is obtained from one of the numerous springs in the neighbourhood of Buda-Pest or Ofen in Hungary. These springs yield waters strongly charged with sulphates, and an analysis of the Æsculap Water shows it to contain no less than 3746·6 grains of solids per gallon, of which no less than 3280·1 are sulphates. It is consequently a powerful purgative water, and at the same time it possesses a permanent alkaline reaction. Trials which have been made by ourselves and others show that the purgative action is such as might have been expected from the analysis.

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⁂ Any of the foreign works may be procured on application to Messrs. DULAU, of Soho Square, W.C.; WILLIAMS and NORGATE, of Henrietta Street, Covent Garden, W.C.; or BAILLIÈRE, of King William Street, Charing Cross.

Department of Public Health.

YELLOW FEVER.[1]

BY JOSEPH JONES, M.D. NEW ORLEANS,

President of the Louisiana State Board of Health.

It is important that the President of the Board of Health, in virtue of the responsible nature of his labours, and in virtue of the relations which he holds to the health authorities of surrounding States, should express simply, but definitely, his views upon the nature and pathology of yellow fever, which has, perhaps, occasioned more panic and alarm, and excited more angry controversy, and exposed at once more fully the dark and bright sides of humanity, than any other pestilence of modern times.

To accomplish the end of a distinct, concise, and unequivocal statement, for the consideration of the health authorities of this and other States, I have prepared the following outline of the results of my investigations upon yellow fever during the past twenty-seven years.

YELLOW FEVER.—SYNON.; *Fr.* FIÈVRE JAUNE; *Ger.* GELBES FIEBER. DEFINITION.—A pestilential contagious fever of a continuous and special type: originally developed in tropical and insular America; occurring only in regions between 45° N. and 35° S. lat.; and dependent for its origin and spread upon a temperature not lower than 70° Fahr. It presents two well-defined stages, the first extends from 36 to 150 hours, according to the severity of the disease, and is marked by rapid circulation and elevated temperature. The second is characterised by depression of the nervous and muscular powers, and of the circulation with slow and often intermittent pulse; jaundice; suppression of urine, albuminuria, and desquamation of the renal epithelium ; diminution of the fibrin of the blood, capillary congestion, passive hæmorrhages from the mucous surfaces, and black vomit ; fatty degeneration of the heart and liver; and convulsions, delirium and coma. It is not dependent for its origin or propagation on those causes and conditions which generate malarial paroxysmal fever, from which it differs essentially in symptoms and pathology. As a general rule it occurs but once during life.

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[1] From the *Annual Report of the Board of Health*, for 1881.

History.—The origin of the American plague, or yellow fever, is involved in doubt, in consequence of the prevalence in regions in which it occurs, both amongst natives and foreigners, of severe forms of malarial fever often attended with jaundice, passive hæmorrhages, and black vomit. In the eleventh century, a disease closely resembling yellow fever, known as the Matlazahuatl, made great ravages amongst the Mexicans, but it was peculiar to the aborigines, never attacking white people, whilst on the contrary, Mexican Indians seldom suffer from yellow fever. According to authors, the first trace of yellow fever was observed at the end of the fifteenth or beginning of the sixteenth century, at San Domingo and Porto Rico; and Columbus landing at the former place in 1493, lost the greater number of his men, within a year after their arrival, from a disease described as being "yellow as saffron or gold." From 1544 to 1635, when it appeared at Guadaloupe, there is no record of any outbreak, but thenceforward it occurred at irregular intervals. In the seventeenth century it spread along the east coast of America, as far as 8° S. lat. and 42° N. lat., appearing for the first time in the United States at Boston in 1693. In the eighteenth century it appeared on the west coast of South America, and extended even to Europe and Madagascar; the great commercial and military activity of this time doubtless favouring its spread, and increasing the frequency of the epidemics, eighteen being recorded as having occurred in San Domingo in the century. Early in 1700 it reached New York. At the beginning of the present century it reached 47° N. lat. in America, and also prevailed in the Canary Islands, in Leghorn, and in the maritime cities of Spain and Portugal. In 1853, 1867, 1873 and 1878 it spread to a large number of cities, towns, and villages, in the interior of the American continent, being transported by railroads and ships. During this century it appears to have relinquished its hold upon the northern cities of the Atlantic coast, and has been concentrated chiefly along the southern borders of the Atlantic and Gulf coasts. Yellow fever has prevailed almost annually as an endemic at Havana from April to December; and from time immemorial it has been endemic at Vera Cruz.

GEOGRAPHICAL DISTRIBUTION.—At an early day it was established that yellow fever is emphatically the disease of strangers in the warm moist climates of insular and tropical America. It is endemic in the West Indies, and is rarely, if ever, absent, the seasons of the year having but little influence in eradicating it, though the disease is most fatal from May to August. On the other hand, the history of the settlements along the shores of the Gulf of Mexico and the Atlantic Ocean has demonstrated that in the more temperate regions it is a disease of occasional occurrence, and not in the strict sense of the term endemic. Since the disease is dependent in a great measure upon an elevated temperature, its occurrence is limited to tropical and sub-tropical regions, or to countries having a tropical climate or a summer of sufficient length and heat. Within these prescribed limits the exciting cause seems to exist, but still the fever has seldom, if ever, shown itself, except in maritime regions elevated but a few feet above the sea. From Brazil to Vera Cruz in one direction, and from Barbadoes to Tampico in another, the exciting causes are in constant, though unequal force, depending on differences of seasons, localities and constitutions. On the Atlantic coast it has extended as far north as Boston, Massachusetts, and Portland, Maine, while in the Mississippi Valley, it has three times appeared as high as Memphis, Tennessee, in latitude 35° N. In an eastern direction, but within the same parallels, it has extended to Cadiz, Xeres, Carthagena, Malaga, Alicant, Seville, Barcelona, and other cities on the coast and in the interior of Spain. It has prevailed several times at Gibraltar, once at Rochefort, twice at Lisbon, and once at Leghorn. It prevailed at Monte Video, latitude 34° 35′ S. in 1857 and 1872; in Buenos Ayres in 1858 and 1871; once at Panama and Callao, and at Lima and Cuzco in Peru, in 1854 and 1856. In America it reaches from latitude 36° S. to 45° N. on the Atlantic coast, and to 35° N. in the Mississippi Valley. On the Pacific coast it extends from 15° S. to 9° N. Longitudinal limits in the same country, 60° to 97° W. In the eastern hemisphere it occurs within the limits of 42° N. and 8° S. It is said not to appear in the East Indies or China.

Vertical Distribution.—The older statements, that the disease never extended beyond the height of 2,500 feet, are shown to be incorrect; for it has prevailed in the elevated table-lands of Caracas, 3,000 feet above the sea-level, on more than one occasion; and in 1854 and 1856, it committed fearful ravages in Cuzco at an elevation of 11,378 feet, and even in other places in the Andes at 14,000 feet. Great variety, however, exists in this respect, for at Xalapa, in Mexico, in the same parallel with Vera Curz, 4,330 feet above the sea, it has never prevailed as an epidemic; and the hills in Jamaica and San Domingo are free from the pestilence which rages in the low lands.

ETIOLOGY.—*Relation to Population.*—A certain degree of density of population appears to be essential to the production of yellow fever, which never originates in country districts, but is a disease of crowded cities on the shores of the ocean or large rivers, and of ships. Its origin and spread are favoured by the congregation of persons born in a cold climate; and where developed in strangers who have landed in a port in which it is not prevailing, it appears to be referable to the action of endemic causes upon highly susceptible individuals.

Relation to Temperature.—However violent the disease may be at any place, it is arrested from the day on which the earth is frozen, and such localities may then be visited with impunity by strangers. The singular occurrence of the disease at the high elevations in the Andes above mentioned appears to be due to the fact that, whilst in those regions the night and morning are excessively cold, intense heat prevails in the afternoon.

Incubation.—The period of incubation appears to vary in different epidemics, and in different individuals in the same epidemic, and may extend from twenty-four hours to weeks or even months. In this respect yellow fever resembles diseases of malarial origin, and differs from the well-defined contagious maladies. Whilst in some a few hours' exposure to an infected atmosphere is sufficient to determine the disease, others may remain unaffected until the end of, or even through, several epidemics. Cases have been known to occur in the winter, weeks after it is supposed that the disease was entirely checked, the poison being looked upon as lying dormant in the system. Like many other contagious diseases, it may be communicated to the fœtus, and this is supposed to partially explain the immunity enjoyed by natives of the localities in which it is endemic.

Essential Cause.—The various opinions on this point fall under three heads: 1. That it is a disease induced essentially and solely by contagion. 2. That it is essentially of endemic origin. 3. That being of endemic origin, it afterwards becomes contagious.

The idea has been extensively entertained that intermittent, remittent, and pernicious paroxysmal malarial fevers, as well as yellow fever, assume more or less, according to circumstances, the type of one another, and are essentially the same, modified only by the intensity of the cause and by the prevailing constitution. The marked exemption from the disease of the natives of districts where yellow fever is endemic, with their liability to mild intermittent and remittent attacks, is regarded as supporting this view.

The following facts have been cited to sustain the opinion that yellow fever arises from miasmata: 1. It always appears simultaneously with bilious remittent. 2. A high range of temperature is essential to the generation of its cause. 3. Its first appearance is almost always in the lowest and most filthy parts of towns, and in localities favourable to the production of miasmata. 4. The supervention of storms, heavy rains, or cold weather, puts an immediate check to its progress.

With some writers it is still even a disputed question whether certain fevers which have, or are supposed to have, their source in vegetable miasmata, or in effluvia from marshes, or from infusoria or fungi, developed and propagated under certain combinations of heat, moisture, and putrefying vegetable and animal matters, are subsequently spread by contagion; whilst other writers contend that within the tropics the yellow fever may at any time, under certain conditions of moisture and temperature, arise *de novo*, in the impure atmosphere of the crowded and filthy ship or city. Others again as strenuously uphold the doctrine that yellow fever is a specific, contagious, pestilential disease, which like small-pox or measles, may be transferred and communicated from one ship or city to others, thus following the great avenues of commerce. A third class adopt and advocate a doctrine which embraces the main features of both propositions. Some who hold that yellow fever may be engendered *de novo* in the holds or atmosphere of ships navigating in the warm, moist, tropical regions have coupled with this view the doctrine that if this poisoned atmosphere be allowed to escape at the wharves of cities situated beyond the yellow fever zone, those only who come within the sphere of its influence will be affected, and its subsequent spread will depend upon conditions of filth and crowding of such localities, the disease never spreading endemically but falling harmless among the inhabitants of a salubrious locality. According to this view the development of this malignant fever requires the conjoint operation of both local and general causes, constituting an endemico-epidemic which is unsusceptible of propagation by specific contagion, and in the summer atmosphere of a city lying beyond the yellow fever zone, there must exist some peculiar combination of circumstances, or some peculiar agency, favourable to its development. In these cases it is affirmed that there is generally found an infected district, which slowly and regularly extends its boundaries, rendering all who come within its limits subject to this form of fever.

It has been said that the experience of several centuries leads to the view that the cause of this fever is perennially present in the tropical and sub-tropical cities of America; that it maintains the same relation towards the human system as the other malarial emanations of swamps and low lands, and that it is liable to be developed at any time, in different degrees of intensity, by the combined operation of heat and other agents. Among the most striking circumstances in the ætiology of yellow fever are the marked geographical boundaries within which it is confined, and the circumscribed localities in which it prevails; its more frequent prevalence in the western than in the eastern hemisphere; its almost universal limitation to commercial seaports, elevated but a few feet above the level of the sea, although it occasionally spreads to towns and cities in the neighbourhood of the latter, situated in the interior of the country, on the banks of navigable rivers; and the fact that it is very frequently circumscribed within certain limited and well-defined portions of the locality or city in which it prevails. To these may be added the vastly greater susceptibility of strangers over the natives of regions in which the disease is endemic, although this susceptibility is liable to diminution by residence in the proscribed regions.

ANATOMICAL CHARACTERS.—In cases of death from yellow fever the features are frequently bloated; the skin of the face and upper part of the trunk of a golden yellow colour, whilst dependent parts present a mottled purple and a yellow ecchymosed appearance. Considerable quantities of dark fluid blood escape on section of the muscles, becoming bright scarlet on exposure. Putrefactive changes set in early, appearing sometimes to do so before death.

The *nervous system* presents no characteristic appearances beyond general congestion. Urea, bile, and leucin have been obtained, by analysis, from the brain.

The *heart* is in a condition of acute fatty degeneration, of a pale yellow or brownish-yellow colour. This degeneration is more extensive and more rapid than in any other disease. The cavities are usually filled with dark fluid blood, which contains an excess of urea, ammonia, and extractives, with a great diminution of fibrin. No such appearances are found in the heart in malarial fever.

The *lungs* present extreme congestion of dependent portions, and sometimes circumscribed hæmorrhages into the pulmonary tissue.

The mucous membrane of the *stomach* is frequently intensely congested, softened, and eroded, often containing large quantities of black vomit of an alkaline reaction, from the presence of ammonia, resulting from ante-mortem decomposition of the urea. Microscopically the vomit is seen to contain red blood corpuscles, gastric epithelial cells, dark masses of hæmatin, and sometimes vibriones and other fungi.

The *intestines*, as a general rule, are dark-coloured and distended with gas, sometimes containing large quantities of dark altered blood, of an alkaline reaction. Bile is always absent from the intestinal contents. Intussusception of the bowels is by no means unfrequent.

The *liver* is yellow and bloodless, and the stroma and secreting cells are infiltrated with fat, though the organ is firmer than is the case in ordinary fatty degeneration. None of the pigment deposited in the portal capillary system in malarial fever is found in yellow fever. When yellow fever has been preceded by, or engrafted on, malarial fever, the liver presents the appearances of both of these diseases; and hence, some confusion has occurred in the recognition of the normal pathological appearances proper to each. The golden-yellow colour of the yellow-fever liver can be extracted both by alcohol and water. A similar decoction of the malarial liver is of a brownish-yellow colour. In the latter case, also, the organ is softer, contains more blood, and is readily dissolved by liquor potassæ, forming a solution of the appearance of venous blood, which is not the case in yellow fever. Large quantities of urea and fat, as well as glycogen and glucose, may be obtained from the yellow-fever liver, whilst as a general rule grape-sugar is absent from the malarial form.

As a general rule the *gall-bladder* is contracted and flaccid, and contains but very little bile; but sometimes it is distended with dark, grumous blood, and occasionally an albuminous, mucoid liquid, without a trace of bile. In malarial fever, on the contrary, the gall-bladder is usually full of dark, greenish-black bile.

The *spleen* is but slightly enlarged as a rule, and is frequently normal in size and appearance, internally as well as outside.

The *kidneys* are of a brownish-yellow colour and loaded with fat. The Malpighian corpuscles and tubuli uriniferi are filled with granular albuminoid and fatty matter, detached epithelial cells and oil-globules.

The *urinary bladder* is almost always empty; the little urine that it may contain is of a light yellow colour, free from crystalline deposit, and loaded with albumen.

SYMPTOMS.—*Period of Invasion.*—The symptoms of yellow fever at this stage are uncertain and ill-defined. Attacking a community, as this disease does, without discrimination of age, sex, or state of health, those only being exempt who have already suffered from the malady, it of necessity offers the greatest variety of manifestations. The onset as occurring suddenly in apparent health is marked by intense headache, rigors, pains in the limbs and back, rapid rise of temperature, eyes glistening and suffused, congested countenance, intense thirst, anorexia, uneasiness at the epigastrium, nausea, and vomiting.

Stage of Chill, or Primary Depression.—Here, also, the symptoms are not uniform. In some cases, and even in those of the greatest violence, chills are entirely absent, or amount only to a sense of coldness. In others they are deep, penetrating, and stupefying, or alternate with flushes of heat and crawling sensations; or the constriction of peripheral vessels may be extreme, causing a shrivelled appearance of the skin. In some cases, again, the disease is ushered in by giddiness, and in others with convulsions. Neither the presence nor absence of chills, therefore, can be regarded as characteristic. The chills, when they do occur, differ from those occurring in true malarial fever, and rather resemble those which may take place at the onset of such diseases as small-pox or pneumonia.

Stage of Reaction.—The stage of active febrile excitement follows the chills, or the premonitory symptoms of uneasiness, prostration, and languor, with severe pain in the head and limbs, in the form of a rapid elevation of temperature. This ranges in the first day of the disease, according to its severity, from 102° to 110° Fahr. in the axilla; and it is probable that the internal organs attain in some cases a temperature of 115°. As a general rule, from the third to the fifth day it falls to the normal standard, and even below it; in some fatal cases it rises again towards the end, rarely, however, exceeding 104° Fahr., and rarely attaining the high degree reached at first. The supervention of any inflammatory condition, or the occurrence of an abscess, will also cause a rise of temperature, with slight evening exacerbations; but as a rule, the secondary elevation thus caused never equals the maximum of the stage of active febrile excitement. When malarial paroxysmal fever is engrafted upon yellow fever, in its later stages, or during the period of convalescence, the temperature during the hot stage may even exceed the maximum of that of yellow fever, but it will be characterised by sudden periodic depressions and elevations recurring at definite intervals. The pulse, when reaction has set in, is rapid, strong, tense, and full, though occasionally feeble and compressible. The increase of the frequency of the pulse does not, however, as a general rule, continue to correspond with the elevation of the temperature; and in many cases the remarkable phenomenon is witnessed of the pulse progressively decreasing in frequency, and even descending below the normal standard, while the temperature is maintained at an elevated degree. This singular circumstance is of great diagnostic value, as serving to distinguish yellow fever from other diseases, and especially from malarial paroxysmal fever; and also as indicating the presence in the blood of a poison possessing a specially depressing influence on the heart. On the other hand, the pulse may increase in frequency but diminish in force near the fatal issue, with a fall in temperature, particularly if there have occurred free hæmorrhage from the stomach.

The stage of febrile excitement is not of fixed duration, and may in some of the gravest cases appear to be comparatively mild and unimportant. At the same time the pains may be so slight, and there may be such an absence of delirium, and but small failure of strength, that both patient and physician may be deceived, and yet the former may die without taking to his bed. In most of these so-called "walking cases" the kidneys have been involved from the inception of the disease, and complete suppression of the urine has supervened before death. This latter symptom is almost invariably fatal, and is a chief cause of the hæmorrhages from the stomach and bowels, and also of the marked blood-changes leading to severe nervous disturbances and frequently to sudden death. There is no doubt but that the fever-poison directly interferes with the nutrition of the gastro-intestinal mucous membrane, liver, and kidneys, loading thereby the already vitiated blood with the abnormal products of their disintegration, whilst the circulation of the impure blood necessarily affects all the tissues of the body and intensifies the morbid changes in those organs primarily attacked by the specific poison. The action of the poison o the yellow fever during the stage of acute febrile excitement is manifested not only by intense pain in the head and back, and the florid congestion of the eyes and skin, the anorexia and nausea, the pyrexia and increased frequency of pulse, but also by the albuminuria, which is rarely entirely absent in severe cases, and may make its appearance on the first day of the febrile state.

The congestion, so marked upon the conjunctiva and skin, extends also to the internal organs, and is well seen in the injected nares, crimson lips, scarlet tip and edges of the tongue, and brilliant congested fauces. As a general rule, in the stage of febrile excitement, the tongue is pointed, red at the tip and edges, and coated with thick white and yellow fur in the centre and on the roots.

After the febrile excitement has continued for over three days, in severe cases the tongue may present a corrugated, cracked, and bloody appearance.

We never observe in specific yellow fever the broad tongue with indented edges, which often characterises the prolonged action of the malarial or paludal poison.

The gums are red, spongy, and often bleed upon pressure.

The fact that mere examination of the throat and depression of the tongue is sufficient to cause nausea and retching, is an important diagnostic sign.

(*To be continued.*)

THE PRACTITIONER.

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Original Communications.

ON THE INDIVIDUALITY OF ACTION OF THE COMPONENT PARTS OF A DRUG.

BY SYDNEY RINGER, M.D.,
Professor of Medicine at University College;

AND HARRINGTON SAINSBURY, M.D., M.R.C.P.

THE present paper, though complete in itself, is in some respects a sequel to a paper On the Action of Salts of Potash, Soda and Ammonia, on the Ventricle of the Frog's Heart, read before the Medico-Chirurgical Society, June 13, 1882.

A few words on the subject of the spontaneously beating heart may preface the consideration of the subject proper of this present paper.

A ventricle beating spontaneously may be considered under two aspects. It beats *at a certain rate*, it beats with *a certain force.* The tracing which such a heart gives with the apparatus here employed, and subsequently detailed, shows this *contraction rate* or *rhythm*, and also by means of the height of the trace the *completeness of each individual contraction*, if not the force of each contraction. We have, then, these two elements for consideration, "*contraction rate*," and "*contraction height*."

In the previously mentioned paper it has been shown that that which underlies and is measured by "contraction height" must be dissociated from that which underlies and is measured by "contraction rate," inasmuch as either may be influenced independently of the other. For the above underlying elements the terms "*contractility*" and "*excitability*" were respectively substituted. The latter term it was found necessary to define, since without such, more was implied than the experiments justified. It has been held and taught that the ventricle of the frog's heart is capable of showing rhythmic contractility apart from any nervous structures—still more recently this view has again been called in question; and whilst the property of responding to stimulation by contraction has been limited to muscular tissue, that of regulating the supply of stimulation has been assigned to nervous tissue. However this may be, the experiments detailed in the previously mentioned paper do demonstrate the presence of TWO underlying elements.

Of these, the one answering to contractility is obviously muscular in nature. The other, answering to excitability, is of more doubtful nature; still, whether generating the stimulus or not, it apparently has to do with the supply of the stimulus, and in this respect is like nervous tissue. For the sake of simplicity, then, the term nervous may be perhaps applied to that element which underlies contraction rate, though it will be clearly understood that the only grounds on which this name is here applied are those of similarity of function.

Since Dr. Gaskell's paper, more care has been taken in the application of the ligature, so as to secure this as nearly as possible in the auriculo-ventricular groove; in many cases no trace of auricle could be seen below the ligature, yet these ventricles have behaved precisely like those others in which more or less of the auricle was below the ligature. The ligature has in all cases been drawn as tightly as the thread would permit, and it is difficult to conceive that the force employed should be unable to destroy any physiological connection between the parts above and those below the ligature.

We now come to the determination of a point incidentally touched upon in the paper already cited, viz., the determination of the "individuality of action of the component parts of a drug."

The question here to be considered is whether one element or group of elements present in a series of compounds does manifest itself by imparting a uniformity of action to such compounds, or whether each compound acts as a whole, the component elements not being recognizable.

Clinical experience would certainly be to the effect that certain elements and groups of elements do retain their individuality of action to a greater or less degree, but clinical experience is neither simple enough nor definite enough to be able to thus set the question at rest.

The experiments were made with a Roy's tonometer, which, by means of a double cannula, to the end of which the ventricle of the frog's heart is secured, allows of a circulation being maintained through the ventricle by simple syphon action. The heart itself is immersed in an air-tight oil chamber completely filled, a movable bottom, to which a lever is attached, is forced upwards by the atmospheric pressure each time the ventricle contracts and empties itself.

The contractions of the ventricle are recorded by means of the lever on the blackened surface of a revolving cylinder. At regular intervals of time, each quarter revolution of the cylinder, the drug was added to the whole mass of blood. The dose was almost invariably the same for each drug, and indeed for each experiment, and was so calculated from previous experiment as to stop the heart within about an hour. The reason for this limitation of time was the avoidance by it of the element of exhaustion.

The circulating fluid consisted of a solution of 8 grammes of dried bullocks' blood in 200 cubic centimetres of a saline solution; this latter consisted of 5 parts of saline solution, $\frac{3}{4}$ p.c., and 2 parts of water.

Of this blood mixture 100 cubic centimetres (about 3·5 oz.) were taken for each experiment.

The experiments were performed during the months of February, March, and April, 1882.

The common English frog (*Rana temporaria*) was throughout used.

A heart thus prepared, and the circulation started, soon begins (with very few exceptions) to beat, and as a rule within 10 minutes or so from thus starting it has settled down to a uniform rhythm. The two elements which we then have to note are the characters of each individual beat, and the rate of succession of the beats.

The term "inhibition" will be constantly used in this paper. It may be defined as either *complete arrest* of the spontaneous beats, or marked slowing of these, whilst during the long intervals separating succeeding beats, or during the interval of complete suppression, the ventricle may be still made to contract by electrical stimulation. Thus it means arrest or marked slowing of the spontaneous beats, whilst the ventricle is still electrically excitable.

When the arrest has been complete, the inhibition has been spoken of as complete.

The term "diastolic contraction" will also be frequently employed. It names a form of contraction of a very slow character, which is frequently observed with certain drugs, *e.g.*, the caustic alkalies amongst others. It is observed during the intervals separating spontaneous beats. This phenomenon has been described in the *Journal of Physiology*, Vol. III., No. 3, in a paper on the Action of the Hydrates of Soda, Ammonia and Potash on the Frog's Heart.

The term "*persistent spasm*" has been used synonymously with diastolic contraction.

Lastly, there remains the term "tetanus" to define. By it is meant fusion, more or less complete, of neighbouring beats. If the ventricle of a frog's heart be subjected to continuous faradization, provided the strength of the current, and the rate of interruption be sufficient, there results more or less fusion of adjoining beats. This fusion has been called "*tetanus*," and when spoken of it has been qualified according as the fusion was complete or incomplete.

Salts of the bases potash, soda and ammonia were examined, viz.—

The citrates of potash.
The sulphates of the three bases.
The carbonates and bicarbonates of potash and soda.

These experiments were performed on precisely the same plan as those already detailed elsewhere with other salts of the same three bases, and hence are strictly comparable with these latter. The results of both series of experiments will be used here in the consideration of the subject in question.

In the comparison of the action of salts one with another, quality of action comes first, and taking potash salts, the action of the hydrate of potash may be first described. Then the action of the various potassium salts may be compared with this, and the modifying influence, if any, of the acid radical in each case noted.

The actual experiments with hydrate of potassium have been detailed in a previous paper; the effect may be summarized shortly. On rhythm the primary effect was variable, as a rule there occurred increased frequency. The secondary effect was, *in all cases, slowing*, passing into inhibition, complete, or all but complete. A very prominent feature in the potash tracings was the diastolic contraction, in the latter stages during inhibition the whole course of this form of spasm might be observed.

Comparing the action of tripotassic citrate, a distinctly alkaline salt, with the previous, it is seen that the inhibition is less marked. It is distinct it is true, but the height of the trace is reduced to a much smaller quantity before inhibition occurs than was the case with potash.

Of persistent spasm the charts show no trace.

Dipotassic citrate, though an acid salt, may perhaps be admitted for comparison, inasmuch as the quantity added was so small that it could not be distinctly made out by test paper whether the blood mixture had become acid.

The results obtained were similar to those given by the tribasic salt; inhibition did occur, but it was less marked than for potash. Here also there was no trace of persistent spasm.

The citric acid series of potassium salts would appear very suitable for testing the influence of the base, since you here have the base presented in three proportions, whilst the acid element remains a constant. But the strong acid reaction prevents the use of the mono-potassic citrate, the blood mixture becoming distinctly acid with the quantity of salt required to stop the heart.

Sulphate of potash. This salt comes nearer to potash in its effect on inhibition; thus in five out of seven cases inhibition was marked; of the remaining two it was moderate in one, slight in the other. In three out of the seven cases a slight amount of persistent spasm was observed.

Carbonate of potash, K_2CO_3. This salt is of course strongly alkaline. The tracings obtained closely resemble those of potassium hydrate, marked inhibition being the rule, and persistent spasm coming out strongly.

Bicarbonate of potash, $KHCO_3$. The solution of this salt used was alkaline, though less so than the carbonate. The effect on inhibition was well marked, but rather less so than with the carbonate. Thus, out of six cases, in three inhibition was strongly marked; in one it was moderate, in two slight. Persistent spasm was much less marked, being strongly marked in one case only out of the six, slight in two others; absent in the remaining three.

All the salts above mentioned, including the hydrate, modified in precisely the same manner the effect of the continuous faradic excitation applied to the ventricle. Thus whether one started with a strong or slight tetanus, the drug diminished this tetanus from the first, and in the final stages caused actual suppression of the beats during the time of faradization. The potassium salts described elsewhere, viz., the chloride, bromide, and iodide, inhibited strongly, and modified the effect of continuous faradization as above. They did not cause persistent spasm in the doses used.

The salts of potassium, then, hitherto examined, viz.,

The hydrate,
The chloride, bromide, iodide,
The citrates (tripotassic and dipotassic),
The carbonates (the di-and mono-basic),
The sulphate,

Agree qualitatively on the following points :—

They arrest the heart in diastole,

They show a strong tendency to arrest suddenly the rhythmic action of the heart, *i.e.*, to inhibit.

They render the heart less and less susceptible to the effect of continuous faradization.

On the point of the production of persistent spasm they do not agree; it is, however, to be noted here, that it is the least saturated of the salts of potash which exhibit this spasm in the highest degree, viz., the carbonates, and that of the two carbonates, the one containing excess of the acid radical, viz., the bicarbonate, shows the least degree of spasm.

The production of spasm is to some extent a question of dose, and thus a quantity of a salt, *e.g.* chloride of potassium, which, added gradually, may cause no persistent spasm, may, if added suddenly, cause more or less spasm. This, however, does not affect the question here considered, for the experiments are comparative, and the readiness with which spasm is excited is certainly modified by the acid radical.

In the case of the chloride, bromide, and iodide group, the salts of sodium, ammonium, and potassium have been compared one with the other, and with regard to quality of action it has been shown that the ammonium salts contrast strongly with potassium salts, in that *they do not tend to inhibit*, and further in that their action in lessening the effect of continuous faradization is *less marked.*

The sodium salts of the same group have been shown to stand between potassium and ammonium salts in respect of inhibition, though much nearer to ammonium salts, for their tendency to inhibit is but slight.

With regard to the citrates, similar results were obtained; thus citrate of ammonia was shown *not* to inhibit and *not* to lessen the effect of the continuous faradization applied to the ventricle. Citrate of soda inhibited but very slightly if at all, and did not diminish the effect of continuous faradization.

In the present series, one ammonium salt only, the sulphate [$(NH4)_2S0_4$]) was examined. This salt was very carefully examined and found to be, if anything, slightly acid, therefore any effects could not result from the presence of free ammonia.

Of six experiments, in *no case was there inhibition.* In two cases there occurred well-marked spasm as a primary effect; and in five out of the six cases the beats increased in strength, as a primary effect, the tracing showing increased height, and, as a rule, also increased breadth.

As to continuous faradization, there was no diminution of effect; indeed there appeared to be slightly increased excitability as an early effect of the drug.

The carbonates of ammonium were not taken, on account of their instability and not very definite composition.

Of sodium salts, sodium sulphate did not inhibit, the rhythm remaining so long as the beats were visible.

No persistent spasm appeared.

In the final stage continuous faradization caused the mounting up of the trace already described as occurring with the sodium salts of the chloride group. With sodium sulphate the effect was comparatively slight, but it was distinct.

The effect of continuous faradization was certainly not diminished; if anything, it appeared increased.

Bicarbonate of soda. No inhibition; at any rate in the final stage. The rhythm, in fact, in this final stage being much more frequent than at the start. In four out of the six—preceding this final stage was a stage during which the heart beat in phases.

No persistent spasm appeared.

In the final stage slight mounting-up occurred on continuous faradization. In one case it was very well marked.

Carbonate of soda. No inhibition. Frequency of rhythm, in fact, increased in the end stage.

Persistent spasm very strongly marked.

Slight mounting-up occurred in the end stage on continuous faradization.

With the bicarbonate of soda the effect of continuous faradization became distinctly increased.

With the carbonate this effect was still more marked.

The solution of bicarbonate of soda used was very distinctly alkaline to test-paper, and both this salt and the carbonate in the quantities used appeared in the latter part of each experiment to be dissolving the heart to some extent, there being very considerable oozing from the heart; and when removed at the end of the experiment, the heart feeling distinctly soapy.

This is mentioned here because, in spite of very evident changes affecting the substance of the heart, whether of the nature of solution or not, the rhythm still persisted.

Ammonium salts, then, so far as they have been examined, agree in that they do not inhibit; further, they agree in their primary effect, viz., increase of the force of the ventricular contractions, together with, as a rule, more or less persistent spasm.

Sodium salts agree in their slight action on rhythm, and also in that with all the salts named; with the exception of the citrate of soda, mounting up occurred in the final stage.

Having compared these salts qualitatively, it remains to put together the quantities used, and see if these make clear the dependence on the base as the essential factor in the action of the drug. If this be so, and the acid radical do but slightly and unappreciably modify the influence of the base, then, confining one's attention to salts of one base, the quantities required of such to arrest the heart will contain equal weights of the basic element, *i.e.* the quantities will stand to one another in the proportion of the molecular weights.

In the following table of quantities, in the column headed "weights containing equal quantities of basic element," the numbers given represent either the molecular weight or the molecular weight divided by the number of atoms of base present. This is of course necessary, for weights of say tripotassic citrate and of iodide of potassium, in the proportion of their molecular weights, would contain three atoms of potassium in the former to one in the latter. The salts examined either did not contain any water of crystallization, or this was carefully removed, so that the solution percentage was calculated for the anhydrous salt.

It was attempted to make the sodium series more complete by including the hydrate, but though the rate of dosage was made very small, so as to extend the experiment over a much longer period than in the case of the others, it was found that the heart still became firmly contracted in systole. At the same time the heart oozed very considerably, causing the pen to fall, and giving to the tracing the appearance as though the heart really had gradually dilated. From the tracing, in fact, one would have concluded that the heart did finally pass into a state of diastole.

QUANTITY TABLE.

Name of salt.	Weights containing equal quantities of basic element.	Actual quantities found, in grains.
Potassium Hydrate	56	1·35
,, Iodide	166	3·16
,, Bromide	119	3·28
,, Chloride	74·5	2·46
,, Sulphate	$87=(\frac{174}{2})$	3·85
Tripotassium Citrate	$102=(\frac{306}{3})$	2·31
Dipotassium Citrate	$134=(\frac{268}{2})$	3·39
Potassium Carbonate	$69=(\frac{138}{2})$	2·0
,, Bicarbonate	100	3·25
Ammonium Iodide	145	6·3
,, Bromide	94	3·7
,, Chloride	49·5	2·93
,, Citrate		
,, Sulphate	$62=(\frac{124}{2})$	2·93
Sodium Iodide	150	84·24
,, Bromide	103	51·7
,, Chloride	58·5	29·77
,, Citrate		
,, Sulphate	$71=(\frac{142}{2})$	55·7
,, Carbonate	$53=(\frac{106}{2})$	22·2
,, [1] Bi-carbonate	84	44·74

In the foregoing table the potassium series, as the most complete, may be best considered. If the numbers experimentally found be compared with those in the molecular weight column, it will be seen that the correspondence is not such as to justify the statement that the potassium element alone rules the effect. With certain of the salts it will be seen that the numbers representing them in either column do stand to one another in somewhere about the same proportion; in other instances the correspondence fails. But just as the correspondence is not sufficient to justify, so the failure of correspondence is not sufficient to negative the above statement. To set this question at rest a more numerous set of experiments will be needed.

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[1] The number obtained here was in four of the experiments with a five per cent. solution, which was substituted for the ten per cent. solution, as all the salt did not go into solution at this concentration. With the five per cent. solution 50 c.c. only of blood were used.

However this may be, one must draw attention to the closeness with which the numbers come out, for this constitutes one of the chief features of resemblance between the potassium salts. Very small quantities are here dealt with, and of course very small errors cause in such cases wide divergence; yet, omitting the hydrate of potassium, which is not ordinarily included amongst the salts of potassium, and which, on account of its extreme alkalinity, does not well compare with neutral salts, it will be seen that 2-4 (3·85) grains will include the extremes of variation. Even these limits include strongly alkaline salts, *e.g.*, the carbonate of potassium and the tripotassium citrate; excluding these, the range of variation is within narrower limits. This qualitative resemblance is the more remarkable when one compares the acid radicals one with the other; thus, between the acid radical of the sulphate and the acid radical in the bicarbonate the difference in quality could hardly be greater. This is perhaps still better seen by comparing the hydrogen salts, viz. sulphuric acid and carbonic acid (H_2SO_4 with H_2CO_3). The difference in properties is extreme; yet neutralize potash with these two acids and the resulting salts, the sulphate and bicarbonate, differ so little in their action that, as tested by the ventricle of the frog's heart, the numbers 3·85 and 3·25 represent their activities respectively.

It must be remembered, as has been elsewhere stated, that the proposition is not that one element or group of elements in a drug alone should act, but that such element or group should be capable of more or less individual action, hence that some degree of uniformity of action should be traceable through a series of salts containing the particular element or group of elements. The salts of potassium, as here tested, certainly seem to bear out this proposition, and side by side with the fact of their resemblance to one another in containing the same element—potassium—must be placed their similarity of action, qualitative and quantitative, whether the conclusion be drawn that such connection is of cause and effect or not.

So far as examined the salts of ammonium and of sodium show a similar resemblance in their action.

The question is one of great importance, and very practical in its outcome, for if such one-sided action do hold, then it is clear that, given the element or elements we wish to use for their special effect, we shall choose for the other side of the drug the least active elements we can find; thus, supposing that on certain tissues the iodine be the active agent we desire, and we have the choice of combining this with sodium, ammonium, or potassium, we shall choose the first. We thus shall have some rule to guide us in the choice of drugs, till actual experiment in each case determine whether the action of one side is all we require, or whether in the particular case in question we need the action of both sides.

It may be mentioned that the metals of the alkalies, sodium, potassium, ammonium, have special importance in that their salts as a rule are soluble, and hence suitable for internal administration.

It is necessary, in order that misunderstanding may not occur, to lay stress on the statement already made, that individuality of action of the component parts of the drug is the sole contention. It is true that the experiments here which give for potassium bromide and potassium bicarbonate almost identical figures, would seem to indicate that one side of the drug alone was active, that the bromine and the carbonic acid formed no part of the characteristics of the drug named. Clinical evidence negatives such a conclusion very decidedly. Thus the bromides of the three bases, sodium, ammonium, potassium, show a similarity of action which can scarcely be explained, excepting on the ground of their containing in common the element bromine. The same may be stated for the iodides, whilst for the element chlorine, clinical evidence would seem to point to its activity in the compounds of the marsh gas series, to which chloroform and bichloride of methylene belong.

Clinical evidence, then, to go no further, would point to a chlorine, bromine, and iodine action, and indeed without such evidence the proposition is an inconceivable one, that elements of known activity should, on entering into combination with other elements, exert no influence whatever in modifying the activity of these other elements, and yet retain no individual action of their own—in fact, should simply disappear.

The fact that the heart's action, as here tested, is not capable of demonstrating this other side of the drug action remains. No explanation will be here attempted, though it is clear that a scheme such as the present will obviously fail in demonstrating changes which naturally spread over considerable intervals of time, *e.g.* those of growth and decay, which changes certain drugs affect very markedly. As it fails in this respect it may fail in many other directions, and the recognition of but one side of a drug must be set down to imperfection of the *schema*.

In the consideration of this one-sided action of drugs, the actual results obtained, apart from any theory, must not be lost sight of.

In addition to the salts of the three bases, potassium, sodium, ammonium, already examined, others have been added to the series, and these have yielded results in conformity with those already obtained.

For the actual numbers reference must be made to the quantity table. It will there be seen that the ammonium salts come very close to the potassium salts, whilst the gap separating the sodium salts from these two is a very wide one, the latter salts being 10-20 times less poisonous than the ammonium or potassium salts.

Further, as to inhibition, the results here are similar to those already obtained. Potassium inhibits strongly. Ammonium, if anything, appears to act the other way, the contractions growing less and less in value, whilst the rate of contraction is accelerated.

Sodium is near to ammonium; it has, at any rate in the final stages, very little effect on rhythm.

Potassium therefore stands first—as most poisonous; ammonium next; then, with a wide gap between, sodium.

THE CONTINUOUS LOCAL MEDICATION OF THE LUNGS IN PHTHISIS.

BY G. HUNTER MACKENZIE, M.D.,

Lecturer on Laryngology, Physician for Diseases of the Throat, &c., to the Western Dispensary, Edinburgh.

WHETHER we consider the disease of a septic nature with constitutional symptoms mainly dependent upon simple local suppurative processes following inflammation, or as due to the presence of a specific micro-organism, which finds a ready entrance to, and suitable nidus in, the lungs, and rapidly develops and propagates its species under favourable conditions, such as stagnant secretions or denuded epithelium, we are forced to the conclusion that, in pulmonary phthisis, local treatment of the affected organ must be a desideratum in any effective system of therapeutics. It is, in fact, very necessary for us to cease giving every attention to the constitution, and bestow more on the treatment of the morbid local condition. "We and our fathers have, indeed, spent much time and labour in theorising over the abstraction which we call a diathesis or a constitution, in order to account to ourselves satisfactorily for such events as fever, wasting, and secondary disorders arising out of a malady whose earliest structural changes we find in the lungs. But we have not advanced our practical treatment of the disease by such labours. We have multiplied so-called blood remedies, nutrients which add to the pabulum of the chyle, such as oil or chemicals, hypophosphites or iron, which can alter the vital fluids, and in such treatment our aim has confessedly been, not to reach the lung disease, but to obviate, by higher nutrition, the wasting effects of the disease."[1] We all know the success, or rather non-success, which has followed this system.

The facts that the general symptoms during the period of softening in acute phthisis bear a close resemblance to septicæmia, that they are directly proportionate, both as regards time and intensity, to the degree of such softening, that they can be simulated by local (traumatic) irritation of the lung, and that, in such instances, they subside on the discontinuance of the local irritation, indicate that the phthisical process is primarily of a local nature and essentially one of ante-infection. Local disease, itself the result of local inflammation and infection, is the origin and source of this infection.

The stage of softening in phthisis is widely, and justly, recognised as a most dangerous and critical one. From absorption of the disintegrating and decomposing material, most probably with the superaddition of a specific virus, there ensues high fever, with great prostration, often ending in death. It is during this period that the high evening exacerbations of temperature are met with (constituting the so-called hectic curve), not on account of inflammatory complication, but as a result of septic infection. If the patient be piloted through this stage, even though he be landed in a cavity, he yet may be saved. But very early in phthisis, not only has the primary patch of disease to be treated, but the secondary local affections of the lungs also require attention. These are frequently the result, not of direct extension of the phthisical process, but of infection, as indicated by the fact that they are often found at a distance from the original seat of disease, with islets of healthy lung-tissue intervening. This proneness of the lung to infect itself, so to speak, can be readily understood when we consider the free system of inter-communication that obtains in the organ, directly by the air-tubes, or indirectly by means of the blood-vessels and lymphatics. These secondary local affections are mainly observed during the period of softening, and their occurrence adds greatly to the gravity of the prognosis.

In sheering off from the lines of the constitutional towards the local (parasitic) theory of the genesis of phthisis it is not necessary to leave out of consideration such predisposing causes as heredity and scrofula. So far as heredity is concerned, and as Niemeyer puts it,[1] phthisical parents are not isolated in the fact that their children are very prone to phthisis. The same feature characterises in an equal degree the children of aged or scrofulous parents, or of those who have debauched themselves by drink, vice, or other excesses. Parents weakened from any cause propagate a weak offspring, and ancestral phthisis, scrofula, intemperance, and vice tend towards one common goal in the descendants, viz., phthisis.

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[1] *Harveian Lectures on the Prognosis and Treatment of Chronic Diseases of the Chest in Relation to Modern Pathology*, 1880, by J. E. Pollock, M.D.

Why these and similar conditions of constitutional depravity should conjoin in predisposing towards pulmonary disease, would be beyond the scope of the present paper to attempt to determine with any degree of exactitude. Suffice it, however, to recall to mind the fact that the lungs are cellular organs of extreme delicacy of construction; that they alone, of all the organs of the body, are exposed to direct atmospheric influences; that they are the readiest recipients of the morbific particles which continually surround us, and that, on account of their double circulation and excessive vascularity, they afford great facilities for the transmission of septic material from one part to another. Nor, when inflamed or irritated, can they obtain the rest necessary as an aid to recovery. The lung is thus a *locus minoris resistentiæ*. In the conflict between health and disease it represents, as it were, the outpost of the vital powers, and consequently is the first to be attacked. Need it surprise us that it is frequently the first to yield?

The relationship between scrofula and phthisis appears to be of a very intimate nature. Rindfleisch[2] has taught us that scrofula is a frequent precursor of phthisis, and that it is a disease characterised by cheesy infiltration and suppuration of a mucous membrane, a lymphatic gland, or a joint; hence is elaborated a poison which by absorption induces tubercle. Here again crops up the theory of local infection from absorption of a specific virus. Scrofula predisposes to a peculiar form of inflammation which produces infiltrations and exudations of low vitality, in which a poison is engendered which infects the system.

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[1] *Text-Book of Practical Medicine*, 1871, vol. i. p. 173.

[2] "Chronic and Acute Tuberculosis," Ziemssen's *Cyclopædia*, vol. v. p. 634, *et seq.*

But whatever may be the method or methods by which the tubercular poison may be produced, there is increasing evidence to show that not only does the individual in whom it is manufactured run the risk of becoming the subject of self-infection, but he may actually infect others. Aristotle and Morgagni believed consumption to be contagious, and the latter narrates that a healthy dog which lapped the sputum of his phthisical master died of the disease. Dr. Cullimore records a similar case.[1] Laennec, whilst engaged on an autopsy on a tuberculous subject, was wounded with a saw, with the result that a tuberculous nodule developed at the seat of injury. Reginald Thompson[2] believes that at least a certain variety of phthisis is infectious, and quotes Weber, who records the case of a phthisical husband whose several wives successively fell victims to the disease. Similar cases have been recorded by Murrell, McAldowie, and others. It appears probable also that the increasing prevalence of the disease amongst the natives of Madeira and other health-resorts of consumptives, is owing to some degree of infection.

Recently, however, we have obtained more precise and conclusive evidence as to existence of a specific tubercular contagion. Tappeiner has shown experimentally that phthisical sputum has some inherent contagion which, when inhaled, induces tuberculosis. He found that this property was absent from the sputa of chronic bronchitis and from the matter of a scrofulous gland. Klebs and Schüller[3] have indicated, and, most recently of all, Koch has afforded microscopical demonstration of the fact, that the tubercular class of diseases is induced by certain micro-organisms which invade the body and multiply in it; further, that the expectation might be entertained of a cure by the employment of means which are calculated to annihilate these organisms, such as the inhalation of creasote water. Are these organisms present in all forms of consumptions? This appears to have been answered in the affirmative by Koch and

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[1] *Brit. Med. Journ.* 1880, vol. i. p. 768.

[2] "The Infection of Phthisis," *Lancet*, 1880, vol. ii. p. 726.

[3] *Archiv. für Exper. Pathologie*, band xi. heft. 2.

Cohnheim.[1] Cohnheim claims to have established the unity of the virus, not only in the various forms of phthisis, but also with that met with in scrofulous glands, and in this he is supported by Rindfleisch.[2]

If we accept this view, the evidence in favour of which is being daily augmented, that in phthisis we have a disease due to a septic or parasitic organism which finds ready ingress to the lungs and develops in the pulmonary secretions of its victims, it may be matter of surprise that phthisis, common though it be, is yet not more widely encountered. For the pulmonary exhalations of a phthisical patient must be literally swarming with these organisms, and the atmosphere of their apartments must be largely contaminated with them. But in accordance with the general law which seems to govern the development of such organisms, a certain amount of preparation on the part of the individual is necessary before his lungs become suitable soil for their development. His receptivity requires cultivation, and this appears to be the *rôle* played in the process by the so-called constitutional tendency; it acts as the pioneer of the disease, but does not, of itself, induce it.

Now, the bearings of the preceding briefly-summarised views upon the therapeutics of the disease seem clear and decided. Holding the doctrine of a local infection, we have necessarily abandoned the view of a general disorder manifesting itself in local disease, and have arrived at the conclusion that this localisation is the primary cause of the affection. The indications, therefore, for local (antiseptic) treatment of the lungs in phthisis appear obvious. Not only so, but should the primary (infecting) disease be located elsewhere than in the lungs, to this region must the local treatment be directed. A case, for example, has recently been recorded by Bryant,[3] in which phthisis was associated with and, as the result showed, dependent upon, suppuration of the knee-joint, and in which, after amputation, recovery with disappearance of the chest symptoms took place.

But the class of cases to which attention is invited in the present communication is the very large one in which the primary, or infecting, disease is situated in the lungs themselves. In the attempt to carry out local treatment, recourse may be had to surgical means, such as tapping, drainage, and antiseptic injections, and satisfactory examples of this method of treatment have been recorded by Douglas Powell, Williams, Cayley, and others. It is obvious, however, that this method is inapplicable to the earlier stages of phthisis, and, under any circumstances, it requires to be very carefully gone about, and carried out only under the guidance of accomplished diagnosticians. In the method of the continuous inhalation of such volatile substances as possess antiseptic qualities we have a ready and efficient means of acting on the lung and its contents, and it is to this system to which I now venture to direct attention.

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[1] *Consumption as a Contagious Disease*, 1880. Translated by Cullimore.

[2] *Op. cit.*

[3] *Lancet*, 1881, vol. ii. p. 743.

Mindful of the nature of the disease with which we have to cope, our efforts in the direction of local medication of the lung to be effective must be applied with continuity and steadiness, and, if possible, in such a way as not to interfere with the normal method of respiration. I attempted to comply with these conditions by filling the rooms occupied by patients with antiseptic fumes, but without success. The only other method seemed to me to design a medicated respirator which might be carried about and worn by the patient, and so admit of comparative continuity of use. The instrument, which I have designated the naso-oral respirator, was accordingly introduced, and as it is already well known to the profession any detailed notice of its construction and mechanism at the present time is quite unnecessary. It is needless, however, to state that it fulfils conditions which intermittent spraying or the inhalation of medicated steam can never do. The fluids used for inhalation purposes belong to the class of volatile antiseptics, such as carbolic acid, creasote, terebene, eucalyptus oil, &c. In ordinary cases I prefer a mixture of creasote (three-fourths) to carbolic acid (one-fourth, Calvert's No. 1). This is, as a rule, wonderfully well borne even in the case of children. I have already briefly reported the case of a child, æt. 7, who inhaled pure creasote almost continuously for several weeks without difficulty or inconvenience.[1] This child, it may be added, now continues well and strong, and has not inhaled for over a year. Eucalyptus oil, though bland and unirritating, is very apt to produce sickness and nausea. Toxic symptoms have never been noted in any of my cases after the continuous inhalation of carbolic acid or creasote for prolonged periods, nor have I heard of a single instance of their occurrence in the practice of other practitioners. The urine generally remains free from traces of the antiseptic inhaled, but on two or three occasions very minute traces of carbolic acid have been found after the use of this drug.

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[1] *Lancet*, 1880, vol. ii. p. 870.

The results obtained from continuous inhalation in suitable cases—and most cases appear to derive benefit to a greater or less extent—are manifested in a decrease of the pyrexia, cessation of night-sweats, improvement in appetite, and increase in weight. In accordance with Ringer's proposition,[1] we are justified in guaging the measure of progress in phthisis by the thermic curve, though it is fair to note the fact that such an experienced clinician as Theodore Williams [2] maintains that tubercle may form in more than one organ without giving rise to any marked rise of temperature, and, in fact, with subnormal temperatures. Experience seems to be rather against the general acceptance of this latter view, and I think we are still justified in considering the fever and emaciation, represented by the temperature and weight, as the true measure of the patient's progress. A case of acute phthisis, illustrated by a complete series of temperature charts, has been recorded by me,[3] in which it was experimentally shown that, on commencing creasote and carbolic acid inhalations the temperature fell, the night-sweats ceased, and the appetite improved, only, however, to return on the discontinuance of the inhalations. On resuming treatment the same results accrued as on the first occasion. This patient is still under my notice, and continues well without requiring to practice inhalation. He has increased in weight fourteen pounds within the last year. I have repeated these experiments in other instance, and carefully noted the results, and am satisfied that antiseptic inhalations, continued for sufficient periods of time, have a decidedly antagonistic action to the tubercular virus. I am inclined to believe that better results are obtained in what might be called specific cases proper, in contradistinction to chronic inflammatory ones. The former are characterised by all the features of fever, symptoms from which the latter are, to a great extent, free.

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[1] *The Temperature of the Body in Phthisis*, 1873.

[2] *Lancet*, 1881, vol. i. p. 970, *et. seq.*

[3] *Lancet*, 1881, vol. i. p. 775.

But besides the applicability of this system to cases of acute specific febrile phthisis, it seems probable that local medication of the lung is likely to prove beneficial in certain allied conditions, for instance, bronchierictasis. As stated by Theodore Williams,[1] the commonest form of death in this disease is from septicæmia, some of the decomposing material being inhaled into the sound lung and setting up fatal septic pneumonia. What better method of obviating this than by the careful and constant application of antiseptics to the lungs?

The contraindications to the employment of continuous medication are laryngeal complications, hæmorrhage, and great destruction of lung-tissue. In laryngeal phthisis, strong inhalations have a very irritating and drying effect on the throat, and here it is better to discontinue them entirely, or reduce the strength of the inhalant by the addition of three or four parts of rectified spirits. I am of opinion that, in two or three instances, I have noted an aggravation of hæmorrhage after the use of the naso-oral respirator, so now I make it a point to have all bleeding stopped before commencing continuous inhalation. The undesirability and inutility of torturing a patient with extensive lung destruction by the superaddition of a system of treatment at the eleventh hour, which, under the circumstances, might prove troublesome, merely require passing notice to be avoided.

In regard to adjuvants, the usual attention is required to cleanliness, ventilation, and pure air. In the prophylaxis, as also in the treatment, of the disease, it is to be borne in mind that the lungs are readily influenced by dampness both of the atmosphere and the soil, more particularly the latter. A moist climate with a high or a quickly-changing temperature predisposes to lung disease. Intense cold, if associated with dryness of the atmosphere, has no predisposing effect. An interesting example of this was Sir Allen Young's Esquimaux, who became phthisical on his removal to a southern clime, and recovered on returning to his native cold. Confinement and sedentary occupations should be avoided, for they predispose powerfully to the disease and aggravate it when existent. In Switzerland, for instance, the mortality from phthisis in the case of those following out-door occupations is only about one-half of that occurring amongst the in-door section of the population. The dieting of the patient is of importance. Struck by the fact that tuberculosis is more common and can be more readily artificially induced in herbivorous than carnivorous animals, I have, for some time back, forbidden the use of vegetables in phthisis. Lately there has been published a most interesting and valuable report by Mr. Spears (Local Government Board) in regard to the outbreak of woolsorters' disease at Bradford. Knowing the predilection of the anthrax contagion for herbivorous animals, and remembering the experiments of Feser, who found that rats on a flesh diet could not be inoculated with the disease, whilst the same rats, when fed with vegetables, were readily inoculated and rapidly died, Mr. Spears was led to inquire minutely into the circumstances attendant upon the outbreak of the disease in individual woolsorters. He found that, in almost every instance, its development dated from a Saturday or a Sunday, being coincident with, or immediately following, the feast of vegetables and herbs which the operatives generally indulged in on those two days. I am inclined to believe that the virus of tubercle has, in the manner of its development, certain resemblances to that of anthrax; at any rate, of this I am certain, that tubercular patients thrive better on a nitrogenous than a carbonaceous diet. Dr. Clelland[1] also found alcohol, a carbonaceous compound, to be prejudical in phthisis, and he attempts to account for this on the ground that phthisis is a disease with diminished respiration, and consequently a diminution in the amount of carbonic acid excreted, which becomes aggravated on the administration of alcohol. Some interesting experiments might be performed in regard to this point, but as the paternal government under which it is our good fortune to live has wisely decreed that these shall not be permitted except under troublesome and harassing conditions, their prosecution must be left to the enterprising spirits of other nations. With continuous medication the internal administration of drugs is seldom required. Those who have faith in the efficacy of cod-liver oil may use it, though I believe its indiscriminate and prolonged use frequently does harm by upsetting the stomach, and also by contributing towards the fatty degeneration of organs. With implication and softening of lymphatic glands, the best remedy is the chloride of calcium, given in ten grain doses in the manner recommended by Sawyer.[1]

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[1] *Brit. Med. Journ.* Feb. 26, 1881.

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[1] *Glasgow. Med. Journ.*, Dec. 1878.

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[1] *Brit. Med. Journ.* 1880, vol. i. p. 845.

THE INHERITANCE OF BRIGHT'S DISEASE OF THE KIDNEY.

BY JOSEPH KIDD, M.D.

I DESIRE to narrate a singular experience of family inheritance illustrating the natural history of Bright's disease of the kidney extending through *three* generations. Having attended many members of the family for a long time I am able to relate the course and termination of the disease in some, and the very slow progress in others still living. To know the natural history of Bright's disease is to have knowledge upon which to found an encouraging prognosis. To keep hope before the patient is often of vital consequence. The inheritance of disease has a deep interest for the medical profession and for society in general. It brings in many subjects of importance relating to intermarriage, bringing-up of children, life insurance, &c.[1]

The accurate knowledge of family history is the basis from which to deduce the laws of inheritancy.

"The world is beginning to perceive that the life of each individual is in some sense a prolongation of his ancestry. The life histories of our relatives are especially able to forewarn and to encourage us, for they are prophetic of our own futures." —*Fortnightly Review*, January, 1882, p. 31. Francis Galton.

CASE I.—Mrs. ——, aged 60, one of a family of most temperate habits, died in 1860 of Bright's disease of the kidneys which had existed for many years. It first showed itself after one of her confinements; most of the children born after that confinement became the subjects of kidney disease. All or most born before that confinement have not suffered from it. She had twelve children, of these *seven died of kidney disease.* Of her remaining five children two have for many years been suffering from the same disease. Of her grandchildren, *two at least* are subjects of kidney disease. Two of her brothers died of Bright's disease in early manhood. A few days before her death angina pectoris came on. (She died before my attendance upon the family commenced.)

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[1] The New York Life Assurance Reports show that one in eleven apparently healthy applicants for life insurance have albuminuria.

Case II.—G., the ninth child of No. I., died in 1872 aged 34. I attended him for some years. He was a tall, strong-looking man of a powerful muscular build, to ordinary observers a picture of health and strength, pulse strong and regular, breathing extremely good, heart sounds natural. He lived a most healthy life, took much open air exercise, an abundance of good food and milk, but abstained altogether or nearly so from alcoholic fluids. He disliked much special attention to his health, but used Turkish baths frequently. His urine was usually transparent, pale, contained a moderate quantity of albumen (varying from one-twelfth to one-eighth of the volume in the test-tube after boiling and the addition of nitric acid); under the microscope a few granular casts, frequently also many crystals of oxalate of lime. In the course of five years the specific gravity gradually fell from 1015 to 1008; the "anæmia" of Bright's disease came on, with a strong urinous smell of the breath, anorexia, nausea, cramps. To this state the most marked relief was afforded by dilute nitric acid, ten drops in a wineglassful of water, two or three times a day. Again and again all the uræmic symptoms were relieved by a few weeks' use of it. He continued to lead a most active life, never sparing himself; the centre of a large business and of much benevolent work. In the early summer of 1872 he visited Malvern, and became suddenly ill. This proved to be scarlatina. Violent hæmaturia came on and death followed in four days with symptoms of uræmia. I visited him at Malvern in consultation with Dr. Johnson, who attended him closely during the scarlatina, and made a post-mortem examination. "The kidneys were found to be much smaller than natural, each weighing $3\frac{3}{4}$ oz. The surface was irregular, several cysts projected from various parts of the cortex, the largest was nearly half an inch in diameter, and was filled with serous fluid. On section the cortex was found to be much reduced in thickness, being not more than a quarter of an inch at its thickest part. Under the microscope, in many parts of the pyramids and cortex numbers of tubes were to be seen completely blocked up with crystalline masses of oxalate of lime. In some places distinct dumb bells were found. In many sections more than twenty such collections of crystals were to be seen in the field of the microscope at one time. These collections obstructed the tubes. In some instances the obstruction thus caused had led to gradual wasting of the secreting structure, to the formation of cysts in one part of the tube, and wasting of the rest. Some of the Malpighian bodies were three times the size of the healthy, others had wasted and were much smaller than natural. Tubes both in the cortical and medullary portions of the kidney varied very much in diameter, some were three or four times the diameter of the tubes in health, others were much less than half the proper size, while not a few appeared to have altogether wasted. The epithelium in some tubes was scarcely altered, but in others it was represented only by small masses of about the size of pus corpuscles." Whether the pathological changes described were due simply to the impaction of the crystalline matter referred to, or the latter but a consequence of previous structural change in the kidney, is open to discussion; probably the kidney had undergone important morbid change before the deposition of the crystalline matter, but it is certain that the obstruction of so large a number of uriniferous tubes must have occasioned serious structural change.

Case III.—C., the tenth child of No. I., died in 1873, aged 30. He, like his brother, led a busy, active life. The disease of the kidneys had existed about ten years. I attended him during four years. The kidney anæmia all this time was well marked, a translucent, waxy-looking whiteness of complexion. His pulse usually quick, irritable, and weak. Heart sounds feeble. The urine was abundant, slightly acid, extremely pale and limpid, almost like spring water. It contained a moderate quantity of albumen; under the microscope, an abundance of oxalates, and a few granular casts, also narrow casts impacted with uric acid and oxalate of lime crystals. As the uræmia increased, cramps came on with sickness, headache, and urinous smell of breath. In this state he derived the same benefit as his brother, G., from the dilute nitric acid, but the good effects were more transient, as the kidney disease was evidently in a more advanced stage. The specific gravity of the urine slowly fell to 1004, with prostration, failing strength, and sickness. As a last resource he went to Egypt in the winter of 1873. There he recovered a good deal, gained strength, and the uræmic symptoms lessened. Contrary to my advice, he returned by Damascus, Constantinople, and Vienna. At Damascus he was struck with low malarial fever; at Constantinople got a chill from the east wind. He reached England dying. Uræmia with coma came on forty-eight hours after arrival. He died, like his brother, of an acute disease supervening on the chronic—a good illustration of the need for care in the management of Bright's disease. Had he returned from Egypt, as I urged him, by the south (Malta, Naples, Marseilles), he might have lived for another year or two. On post-mortem examination "the kidneys were much smaller than natural, one weighing only two ounces, the other only two and a half ounces, capsules much thickened. The cortex was much reduced in thickness, being scarcely more than the eighth of an inch. The secreting structure was very much altered. Many of the Malpighian bodies shrunken and wasted. The uriniferous tubes exhibited every degree of wasting, a few were larger than natural, and dilated at intervals, so as to form small cysts. The remarkable character described in the kidneys of No. II., G., were also observed in this case. Numbers of the tubes, both in the cortex and in the pyramids, were completely choked with collections of crystals, principally oxalate of lime. The tubes had completely wasted in some instances, leaving the crystals imbedded in connective tissue; as many as twelve of these collections were counted in one field of the microscope (quarter-inch object glass). The arteries in every part of the kidneys were thickened, and in some of the smaller arteries and Malpighian bodies amyloid degeneration had occurred."

Case IV.—E., the sixth child of No. I., died in 1880, aged 46.

This is the most interesting of the group. I attended him for seventeen years, during which time he had all the signs and symptoms of advanced granular degeneration of the kidneys. When he came to me in 1863 he was thin, pale-looking, suffering from aching pains in the loins, neuralgic headaches, cramps in the legs, slight œdema of the lower extremities. The kidney disease had then existed for some years, and was taking an unfavourable turn. Pulse generally hard and irritable, varying in frequency from 75 to 85. Heart sounds natural, occasionally complained of palpitation, yet he could climb mountains with ease. The urine was abundant, clear, highly acid; specific gravity varied from 1020 to 1018. It contained a large quantity of albumen, and frequently granular casts. Like his brothers he led an active life, fully occupied in business, but, unlike them, he was easily persuaded to take extreme care of his health—took long holidays, wore Shetland wool underclothing, kept up steady open air exercise. As late as 1876 he was able to walk twenty-five miles in one day in the Maritime Alps, out from 6 A.M. to 4 P.M. without being more fatigued than one in ordinary health. He took care to encourage free perspiration by exercise, and to return home in a glow, so as to avoid chill when fatigued. He often wintered in the south with great benefit; the winter before last at Cannes, where he did well. In an evil hour he was persuaded to take a voyage to Alexandria in March, contracted dysentery there, which nearly cost him his life. He returned from Egypt much broken down in health, pale-looking, and anæmic, with increased œdema of the lower extremities, breathlessness on exertion. He passed a bad autumn (1879) in England. The urine became turbid, the specific gravity fell to 1010, the quantity of albumen increased. Under the microscope many casts, granular, fatty, and hyaline, were seen. In December, 1879, severe pain in the head came on from chill, followed by carbuncles on the face, and blindness of the right eye from œdema of the retina. The specific gravity of the urine rose to 1017 as sugar appeared in it. For the last time he went southwards (to Cannes) in February, 1880; rallied a good deal. He returned homewards in June, crossed the St. Gothard on an *outside seat* of the carriage and caught cold; dropsy of the chest came on at Lucerne, where he died. There was no post-mortem examination. For seventeen years he lived a life of much wise care in the management of health, fully occupied in business, kept to the abundant but not exclusive use of milk, taking little or no alcohol. In every case of intercurrent disease he quickly sought and carefully followed treatment. On the slightest cold or chill he took a few lamp baths, omitting them when in his usual health, being then satisfied with morning tepid or cold sponging baths. He trusted for perspiration more to open air exercise than to baths. When suffering from nausea, headache, with neuralgic pains over the eyebrows, cramps in the extremities, disturbing sleep at night, he derived much benefit from a few weeks' course of three grains of disulphate of quinine three times a day. He often suffered from diarrhœa, with pale evacuations, alternating with constipation, relieved by perchloride of mercury, one-twentieth of a grain three times a day, an hour or two after meals, and a large tumblerful of Vichy water in the early morning. At times, when he suffered from aching pains in the loins, with irritability of the bladder, passing an abundance of pale urine, highly acid, and of low specific gravity, he derived marked relief from Ol. Terebinth. five minims in half a wine-glassful of water three times a day.

Case V., aged 47, the fourth child of No. I., suffered from Bright's disease for twelve years, during most of which time I attended her. The urine was generally pale, opalescent, moderately acid, specific gravity 1014, sometimes higher for a time, occasionally up to 1020. It contained much albumen (one-twelfth to one-eighth), and under the microscope casts granular and hyaline. She inherited her mother's heart condition as well as the kidney disease, often suffered from faintness and palpitation on excitement or exertion, with physical signs of hypertrophy and dilatation of the left ventricle. The heart sounds were weak and indistinct. Although the specific gravity of the urine fell as low as 1012 her health continued good till 1879, when the change of life occurred. An attack of headache then came on with confusion of mind. This was followed by aphasia and left hemiplegia. She recovered after a few weeks of careful treatment, at first by mustard foot-baths and bromide of ammonium, and subsequently by phosphate of strychnia (one grain of strychnia in half an ounce of dilute phosphoric acid, eight drops in water three times a day). With this she recovered muscular and nervous strength, the numbness and paralytic weakness of limbs passed off. She gained strength and appetite from the phosphate of strychnia, whilst even a small dose (half a grain) of quina disulph disturbed, causing headache and excitability. She spent the winter of 1880 at Bournemouth, leading a most useful, active life, and taking much carriage exercise. As the spring of 1881 advanced she became feebler, the specific gravity of the urine fell to 1010, and she had another slight paralytic attack. Breathlessness came on in June, with palpitation and pain at præcordia, rapid weak action of the heart, pulse occasionally up to 150, sudden attacks of vomiting, and pricking in the hands and arms. The urine became scanty, turbid, and putrid, the albumen increased to one-fourth of the volume in the test-tube (after boiling and the addition of nitric acid). Under the microscope an abundance of broken down casts and granular matter was seen. Articulation became more and more difficult. Coma, with twitching of the muscles of the legs came on, and death followed in thirty-six hours with total suppression of urine.

Of her five children *two* are the subjects of Bright's disease.

Case VI.—J., aged 19, grandson of No. I., son of No. V. has had kidney disease for ten years. It came on first after scarlatina, and has progressed slowly. The attack of scarlatina was a slight one; he was kept in bed for a fortnight, but confined to the house for a month. He had no baths till after he was first brought to me in 1872. The kidney disease showed itself within the month. He is strong-looking, but has the suspicious pallor of kidney disease, and is subject to frequent attacks of ordinary catarrh with aggravation of the kidney condition. His urine is usually pale, clear, fully acid, specific gravity varies from 1010 to 1018. It generally contains a good deal of albumen, from one-tenth to one-sixth, occasionally a few casts, granular or hyaline, often lithic acid crystals. He derives much benefit from the use of lamp baths and of perchloride of iron. For two months he took oil of sandal wood (two of Savaresse's capsules night and morning) without any perceptible effect on the albuminuria. For two months also I put him on one grain of indigo, three times a day, without any beneficial results.

For three years past he has taken at least two quarts of milk daily. The approach of winter has manifestly so ill an effect upon him that he winters in the south, at Cimiez near Nice, or at Cannes, or on the Nile. This winter he has gone for a more complete change to the Darling Downs in Queensland.

Case VII.—E., aged 22, grandchild of No. I., daughter of No. V., has suffered from albuminuria for about nine years. It was discovered first after scarlatina, which she, like her brother, had very mildly. She was kept in bed only three or four days, but confined to the house for a month. Warm baths were used frequently. The disease showed itself in her case within the month. It was becoming chronic when she first came under my care some months afterwards. She is a tall, strong-looking girl, of a robust frame, of good colour, yet the urine contains much albumen, varying from one-twentieth to one-eighth of its volume, average about one-twelfth. It is clear, full-coloured, specific gravity varies from 1014 to 1020. Under the microscope there are generally lithic acid crystals, occasionally granular or hyaline casts. Although losing so much albumen, her health and strength remain to all appearance perfect, except that she suffers from languor and disinclination for exertion. For ten weeks lately she has taken Bethesda water, about two tumblerfuls each day, without any perceptibly good results; the urine at the end of the ten weeks' course still containing one-seventh albumen, specific gravity 1019, differing little, if at all, from the examination made before commencing the Bethesda water.

The treatment of disease of the kidney labours under a disadvantage compared with that of pulmonary disease. In the latter, cough, expectoration, breathlessness, wasting, night sweats, easily convince the patient and friends that he is really ill, and that the doctor's care and cautions are not unnecessary or uncalled-for. In kidney disease, on the other hand, there are few objective symptoms, as the patient does not lose flesh or muscular power, seldom has pain in the back or difficulty in urination; he will often protest "there is nothing wrong with my kidneys, for I have no pain in my back." Thus the doctor has much difficulty to get the patient or his friends to take sufficient care or to submit to treatment. The nausea of the latter stages of Bright's disease helps the delusion—"Oh, I am so sick, it must be my liver that is wrong, not my kidneys." It is only when the uræmic symptoms come on that the patient can be induced to take care. They often try to weaken the precautions laid down for them. "Oh, the albumen; does it not simply arise from waste of food?"

In chronic disease of the kidney the treatment must be to a great extent hygienic and dietetic. It acts like an impetus towards health in such cases for the doctor, after prescribing for a month or two's course of medicinal treatment, to dismiss the patient for a season with a cheery word, "Medicine has done its work, now lay it aside for a time, and trust to wise management of your habits of life, diet, exercise, clothing," with a distinct piece of advice concerning each; yet the physician must be on the alert not to repeat vague generalities, but to give a sharply-defined course or plan of general management.

In the treatment of granular degeneration of kidneys, the gout kidney *par excellence*, I can speak with much confidence of the good effects of nitric acid. In many phases of the disease, especially when the urine is very pale, of low specific gravity, and highly acid, with nausea, anorexia, furred tongue, it suits when iron and quinine disagree. It exerts a specific action on the urine, causing the turbid to become clear, and at times it does the opposite, causing the pale clear urine to become turbid and dark-coloured. It also relieves the gout pains in the joints incidental to the disease. The perchloride of iron is of infinite use in the treatment of Bright's disease. In the latter stage of true granular degeneration it often causes headache, and increases the nausea; then the Liquor Ferri Pernitratis Ph. B. suits better, the free nitric acid in it causing the iron to be more easily assimilated.

The use of milk in acute and sub-acute kidney disease has the best effect, but one gets disappointed at the negative results in old long standing cases; its persistent use causing little or no improvement in the condition of the urine. J., case No. VI., drank two quarts of milk daily for six months without perceptible effect on the chemical or microscopical character of the urine.

After twenty-five years' experience of the use of all kinds of baths in the treatment of kidney disease, I have found lamp baths excel all others in real efficacy. The spirit-lamp bath without water has a better effect than the vapour of water boiling over the spirit-lamp, which most patients complain of as being more relaxing and exhausting than the spirit-lamp alone. Used at bedtime for fifteen or twenty minutes three or four times a week, the effect is all we can desire. The gentle moisture kept up in bed all night after the bath does much more good than the Turkish bath, the good effect of which is neutralized by exposure to the cold air afterwards. When the patient lives in the establishment so as to go straight to bed after the Turkish bath, its use is invaluable. Under such conditions it may be taken even twice a day with advantage.

Counter-irritation plays a most important part in the management of chronic Bright's disease. Its effects are especially good in all intercurrent attacks. When from a chill, or over-fatigue, or change of climate, the urine becomes disturbed in character, either cloudy or very limpid, mustard plasters over the loins have a most perceptibly good effect, or compresses of spongio piline sprinkled with a few drops of oil of turpentine. In subacute congestion, a small blister over the kidneys has a good effect as a counter-irritant. It probably has by absorption also a specific action in clearing the débris from the tubuli uriniferi.

Open-air exercise is an essential element in the treatment of chronic disease of the kidneys. It is however of vital consequence to the subjects of that disease to avoid chill when heated by exercise, returning home quickly to change the moist underclothing.

In selecting a winter climate suitable for a case of kidney disease, dryness and equability are the essential requirements. Heat is desirable, but not so essential as freedom from sudden changes. Algiers suits well, Egypt still better. In Europe, Mentone and Cannes are about equal. It is essential too to keep the patient south of the Alps till the end of June. J., case No. VI. passed last winter in Egypt with manifest advantage, left it because of heat at the end of April, returned through Italy in May. When in Egypt the albumen had lessened, but soon after his arrival in northern latitudes slight hæmaturia came on with scanty secretion of dark urine, containing one-fourth of albumen, loss of appetite, lassitude, back ache. Thus in a few weeks he lost all the good effects of the winter in Egypt.

The consumptive with lung disease, after a winter in the south, gains much from the bracing air of Scotland in summer. This proves a most treacherous plan for the subject of kidney disease, who can find a more suitable summer climate in the dry, sunny, sheltered parts of Switzerland.

When there is an inherited tendency to kidney disease, the treatment of scarlatina is of great consequence, as it so often proves the exciting cause of that disease. The special care needed is strictly to confine the patient to bed for at least a week or ten days, the free use of diluents, water or milk, the avoidance of much animal food, and the free use of vegetables. After the eruption has disappeared, the use of warm water baths every night for three or four weeks, warm woollen underclothing in the day, and at night to sleep between the blankets should be advised. The rubbing with carbolic oil should be especially avoided, as although it lessens the intensity of infection, yet I have known it to act injuriously on the kidneys, in fact setting up the albuminuria.

ON A CASE OF ACUTE ATROPHIC SPINAL PARALYSIS OF ADULTS, AND ONE OF HÆOMATOMYELIA ILLUSTRATING THE LOCALISATION OF THE LESION IN THE CERVICAL ENLARGEMENT OF THE CORD IN CASES OF ATROPHIC SPINAL PARALYSIS.

BY JAMES ROSS, M.D., F.R.C.P. LOND.

Assistant-Physician to the Manchester Royal Infirmary.

Several endeavours have been made both by anatomists, physiologists, and physicians to determine the functions of the respective nerves which enter into the formation of the brachial plexus. The purely anatomical method consists, of course, of dissection of the plexus. After maceration of the plexus in dissociating fluid, W. Krause was enabled to trace back the various fibres of each nerve to the roots from which they were derived. His general conclusions with regard to the origin of the nerves of the upper extremity from the roots of the plexus are given in the following table from Quain's *Anatomy* :—

Subscapular ...	3, 6, 7, 8.	Ulnar ...	... 8, 1, or 7, 8, 1.
Circumflex		Internal cutaneous ...	8, 1.
Musculo-spiral ...		Small internal cutaneous	
External cutaneous	5, 6, 7.	Anterior thoracic	outer 5, 6, 7.
Mediam ...	5, 6, 7, 8, 1.		inner 8, 1.

The physiological method consists in observing the results of destruction or of excitation of the various roots of the plexus. Experiments of this kind have been performed on various animals by Müller and van Deen, Kronenberg, Panizza, Peyer, Krause, and more recently by Professors Ferrier and Yeo.[1] The results obtained from electrical excitation of the different roots of the brachial plexus in the monkeys by the last-named authors are the following:—

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[1] See "On the Functional Relations of the Motor Roots of the Brachial and Lumbo-sacral Plexuses," *Proceedings of the Royal Society*, vol. xxxii. March 24 to June 16, 1881, p. 12.

"*First dorsal.*—Action of the intrinsic muscles of the hand, muscles of ball of thumb, interossei, &c.

"*Eighth cervical.*—Closure of the fist with pronation and ulnar flexion of wrist, retraction of arm with extension of the fore-arm. (Long flexors, ulnar flexors of wrist, intrinsic muscles of hand, extensors of wrist and phalanges, long head of triceps, (pectoralis major ?).)

"*Seventh cervical.*—The *scalptor ani* action, viz., adduction with rotation inwards and retraction of upper arm, extension of fore-arm and flexion of wrist and fingers so as to bring the tips against the flanks (teres major, latissimus dorsi, subscapularis, pectoralis major, flexors of wrist and fingers (median), triceps).

"*Sixth cervical.*—The movement of 'attention,' viz., adduction and retraction of upper arm, extension of fore-arm, pronation and flexion of wrist, the palm of the hand being brought towards pubes (latissimus dorsi, pectoralis major, serratus magnus, pronators, (flexors of wrist ?) triceps).

"*Fifth cervical.*—Movement of the hand towards the mouth, viz., raising the upper arm inwards, flexion of the fore-arm with supination, and extension of the wrist and fingers (deltoid (clavicular portion), biceps, brachialis anticus, serratus magnus, supinator longus, extensors of wrist and fingers).

"*Fourth cervical.*—A similar movement of fore-arm and hand, flexion of the fore-arm, but the upper arm is raised upwards and backwards (deltoid, rhomboid, supra and infra-spinatus, (teres minor ?), biceps, brachialis anticus, supinator longus, extensors of wrist and fingers, diaphragm)."[1]

I shall defer for the present the consideration of the results obtained by clinical observers, and shall proceed to report the cases bearing upon this question which came under my own observation. I am indebted to Mr. Blore for the notes of the following case, and to my friend, Dr. Brown of Burnley, who kindly sent the patient to me.

Case 1.—Eliza C., aged 22 years, unmarried, entered the

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[1] "The Localisation of Atrophic Paralysis," by David Ferrier, M.D., F.R.S., *Brain*, vol. iv. 1882, p. 223.

Manchester Royal Infirmary under the care of Dr. Ross on February 19, 1881.

The patient's occupation, that of a weaver, has confined her much within doors, but she has always enjoyed good health, and never suffered from any serious illness. She states that on January 8th, six weeks previous to admission, she caught a chill, and for the subsequent twenty-four hours she suffered from headache of unusual severity. This was on a Saturday, and on the following Monday she felt quite well, and went to her work as usual. About eight o'clock on the Monday evening, however, she was suddenly seized with a severe and continuous pain between the shoulders, which extended laterally over both shoulder blades. She retired to bed and soon slept, in spite of the severe pain from which she continued to suffer. On awaking in the morning she found that her left hand and fingers hung useless, and the pain, although much less severe than on the previous evening, still continued, and did not finally disappear until about a week from the commencement. The patient states that she could still bend the fore-arm upon the arm, and she appears to think that the power of moving the upper arm and bending the fore-arm at the elbow gradually diminished, and were not quite abolished until the end of the first week.

Present Condition.—The patient is rather tall and slender, of fair complexion, and somewhat delicate appearance ; but she has always enjoyed good health, and the internal organs are healthy. When she stands, her left arm hangs helpless by her side. The palm of the hand is directed backwards and outwards; the upper arm being rotated inwards, and the fore-arm pronated. The fingers are slightly flexed at the metacarpo-phalangeal, and completely flexed at the phalangeal joints. The thumb is also flexed at the metacarpo-phalangeal joint, and still more strongly flexed at the phalangeal joint, and its point is directed under the index, and to the side of the middle finger. The patient cannot voluntarily abduct the arm, or rotate it outwards, but she can produce a backward and forward movement of the whole limb, apparently by means of the triceps, latissimus dorsi, and pectoral muscles, the deltoid remaining quite flaccid during these movements. When passive abduction of the arm is performed, the patient can voluntarily adduct the limb with scarcely diminished power, and when passive outward rotation is produced she can perform forcible inward rotation. She is quite unable to flex the fore-arm upon the arm, but when passive flexion is produced she can extend it as powerfully as the other arm. When the fore-arm is held midway between pronation and supination, and semi-flexed upon the arm, the patient cannot produce further flexion of it, and during voluntary efforts at flexion the supinator longus remains quite flaccid. She is also unable to supinate the fore-arm, but when it is passively supinated pronation is powerfully effected. When the fore-arm is supported in a horizontal position, and pronated, the hand drops at the wrist, and the fingers hang loose and pendulous, just as occurs in the "wrist drop" of lead palsy. The patient cannot, by voluntary effort, extend the hand at the wrist, the fingers at the metacarpo-phalangeal articulations, or the thumb at metacarpo-phalangeal or phalangeal joint. When, however, the fingers are passively extended on the metacarpal bones, and fixed in this position, the patient can readily extend the second and third phalanges. When the palm of the hand is laid flat on a table, the patient can separate the fingers from and approximate them to the middle finger with undiminished power. Adduction, flexion, and opposition of the thumb can also be readily effected, while flexion of the fingers and at the wrist joint can be performed with as much power on the left as the right side. The paralysed arm is not perceptibly wasted, but there is some degree of flattening of the posterior surface of the left as compared with the corresponding part of the right fore-arm.

The faradic and galvanic irritability to medium currents is lost in the circumflex, musculo-cutaneous, and musculo-spiral nerves, with the exception of the branch of the latter supplying the triceps muscle.

The deltoid, supra-spinatus, infra-spinatus, teres-minor, biceps, coraco-brachialis, supinator longus, and extensors of the wrist, fingers, and thumb do not re-act to strong faradic currents. The extensor muscles of the fore-arm re-act more readily than do the corresponding muscles of the healthy limb to galvanic currents, and the re-action to anodal closure is equal to that of cathodal closure. The galvanic irritability of the supinator longus, coraco-brachialis, biceps, deltoid, infra-spinatus, teres-minor, and supra-spinatus is only slightly in excess of that of the same muscles on the opposite side, and cathodal closing contraction is in excess of anodal closing contraction.

Every form of cutaneous sensibility is normal in the affected limb, with the exception of a small area over the metacarpal bone of the thumb, which the patient states is numb; but even in this part the sensibility to pain, touch, and temperature is normal.

During a stay of four weeks in the Infirmary no appreciable change took place in the condition of the arm, and the patient was sent to the Convalescent Hospital at Cheadle.

The patient was again examined in the middle of May, and it was then found that the supra-spinatus, infra-spinatus, and teres-minor muscles had recovered motor power, and the patient could now produce a strong outward rotation of the arm by voluntary effort. The arm could also be retracted and slightly abducted, and during this movement the posterior third of the deltoid could be felt contracted. The anterior two-thirds of the deltoid, the biceps, and supinator longus and the extensors of the wrist, fingers, and thumb remained paralysed. No opportunity was afforded of examining the electrical irritability of the paralysed muscles, and the patient was discharged.

June 29.—The patient came to the Infirmary this morning, and it is now found that considerable improvement has taken place. She can abduct the left arm and hold it out horizontally, and during this action every part of the deltoid is felt strongly contracted. She can flex the fore-arm on the arm with considerable power, and on resistance being offered to the flexure of the fore-arm beyond a right angle the belly of the supinator longus is felt strongly contracted. The patient can also supinate the fore-arm with considerable force when previously pronated. The extensors of the wrist, fingers, and thumb, however, remain completely paralysed.

The supra-spinatus, infra-spinatus, teres-minor, deltoid, biceps, coraco-brachialis, and supinator longus re-act to an interrupted current of medium strength, and also to a galvanic current, a minimum contraction being obtained on cathodal closure with twenty cells Leclanché, and on anodal closure with thirty cells. The radial and ulnar extensors, the common extensors of the fingers, and the extensors of the thumb, index, and little fingers do not re-act to a strong faradic current, but these muscles give a minimum contraction on cathodal closure with ten cells and on anodal closure with five cells.

It was now supposed that the extensors would remain permanently paralysed, and Messrs. Wood, surgical instrument makers of this city, constructed, under my directions, a kind of splint, by means of which the hand was maintained fixed in a line with the fore-arm, while the action of the paralysed extensor muscles was supplied by means of india-rubber bands. The instrument was similar to that constructed by Duchenne, only that the spiral wires used by him were replaced by india-rubber bands. The patient now returned to her home with a very useful hand.

Towards the end of December I paid a visit to Dr. Brown, and he kindly arranged for me to see the patient. To my great surprise I found that she had discarded the use of the instrument two months (ten months from the commencement of the disease) previously, and that she had completely recovered all the movements of the hand and fingers. From an ordinary examination I was unable to detect the slightest difference between the motor power of the left and right hands, and the patient considered that she had made a complete recovery, but I had no opportunity of testing the electrical reactions of the muscles.

(*To be continued.*)

Reviews.

Lectures on Curvature of the Spine. By WILLIAM ADAMS, F.R.C.S. Second edition. London: J. and A. Churchill. 1882.

THIS is really a treatise on lateral curvature only, in the form of a series of lectures. It begins with an account of the structure and functions of the spinal column, clearly pointing out the use of the articular processes in limiting movement, and the difference between the intervertebral joints and the joints of the limbs. Some good observations are made on diminished stature at night from compression of the intervertebral discs during the day, but the ages of the observed persons should have been recorded, and observations on persons of middle life also given us for comparison. It is a remarkable omission that here we find no mention of the development of the vertebræ or spinal column. Lateral curvature occurs most frequently during growth, and the vertebræ are not completely ossified until about the thirtieth year. The mode of growth is the key to many of the morbid changes.

Very interesting, indeed, are the remarks on horizontal rotation of the bodies of the vertebræ. The observations of Dr. Dods of Bath, recorded in 1824, are recited. In rubbing the backs of his patients he found a prominence in the loins which he proved to be due to the transverse processes of the rotated lumbar vertebræ. Again and again it is pointed out how important this rotation is, and by cases well reported and figured we see with Mr. Adams' experienced eyes how the chest cavity is altered in shape, and are taught to rely in diagnosis on more important signs than the mere deviation of the spinous processes.

The immediate cause of lateral curvature is asserted to be purely mechanical, but weight is given to constitutional and hereditary tendency, and on this basis a classification is made.

Various bad positions and stooping occupations are credited with causing curvature; but the fact of myopia leading to kyphosis or other deformity of the back is not even mentioned. The tendency to myopia is hereditary, and the defect is progressive, so that often when it occurs associated with curvature of the spine, spectacles may be of more value than spinal supports, and suitable seats than felt jackets.

The Sayre jacket is condemned except for cases of angular curvature dependent upon carious vertebræ.

Percival Pott does not receive his share of credit in the historical part of these lectures. Erasmus Darwin, too, might have been fitly mentioned. Writing in the year 1800, he shows how palpitations and other chest symptoms may depend on curvature, and figures very good apparatus for its treatment by suspension.

The story of the last illness of Dr. Gideon Mantell, the geologist, is well told by Mr. Adams. The post-mortem examination is given in detail. An extreme degree of rotation of the bodies of the vertebræ was found, but very slight lateral deviation of the spinous processes. The pain and the prominence produced by the transverse processes of the rotated vertebræ in the loins led, during life, to the suspicion of abscess, and puzzled Brodie and many eminent men some thirty years ago.

It will thus be seen that the work, though containing much useful and interesting matter, and embodying the digested results of a great experience, cannot pretend to the rank of a complete treatise on its subject as described in the title.

The Other Side of the Opium Question. By W. J. Moore, Deputy Surgeon-General, Bombay. London: J. and A. Churchill. 1882.

Opium Smoking in America and China. By H. H. Kane, M.D. New York: G. P. Putnam's Sons. 1882.

On few questions has an outsider so much difficulty in forming a conclusion as on the opium question. The majority of Englishmen were settling down into a sad belief that the only thing in favour of the Anglo-Chinese opium traffic was that it added six millions per annum to our Indian Revenue. It was startling to many to hear from a man of Sir Rutherford Alcock's ability and experience that the trade is justifiable apart altogether from fiscal considerations. Further evidence of the same kind is however abundant.

In the first book before us we have a plea for the opium traffic from an Indian surgeon of experience. He estimates that between six and eight per cent. of the whole Hindu population take their "umal-pawnee" or solution of opium in water as a daily draught, and in consequence suffer only from the minor ailment, constipation. The valuable properties of the drug are enumerated; with some of which we were of course familiar; in others, such as its power of sustaining the energies of both men and animals under severe and unusual strain, we can well believe. But when it is credited with a power of reducing "eremacausis" or tissue-waste, and so enabling the underfed ryot "to undergo his daily fatigues with far less waste of tissue than would otherwise occur," we fail to follow. Physiologists as well as political economists have long been looking for a nostrum which with a constant income will enable us to increase expenditure, without diminishing the balance: it is not likely soon to be found. Mr. Moore's conclusion is that "there is absolutely no proof that those using opium, either in China or elsewhere, except when using the drug to excess, are in any way injured by the practice." The same might be said of every other article of human consumption, of tobacco, of tea, or of alcohol. The difficulty is to define "excess."

Dr. Kane has made a speciality of treating those who have become enslaved to opium and chloral in America. The habit of opium-smoking, at first confined to the Chinese immigrants, has spread with extraordinary rapidity among the American population. There is now hardly a town of any size in the east and none in the west, where there are not opium-dens. It is a peculiarity of opium-smoking that the devotee, or "opium fiend" as he is termed, cannot enjoy his pipe by himself, but must resort to congenial society. Even women and young girls slink into these lowest slums of the Chinese quarter, and it was owing to the consequent moral contamination that the government of Arkansas first made opium-smoking penal.

With regard to the physiological effects of the habit, the author finds that the pulse is quickened during the early stages, a result which surprises us when compared with Nothnagel's and Gscheideen's conclusion that morphia stimulates the inhibitory mechanism of the heart. In the later stages, drowsiness, nausea, and extreme itching are the prominent symptoms. The cerebral effects the author describes in much the same terms as every one else has done; pointing out however that the popular idea with regard to pleasant dreams is a fallacy. It is rather for the sake of the half-awake luxurious calm the drug produces that it is smoked, and in this condition of exaltation companionship is especially enjoyable. After some months of over-indulgence, however, it becomes impossible to reproduce this pleasant frame. The *habitué* finds himself chained to a habit which affords him little pleasure except by contrast with the pain which results from abstinence.

Upon Chinamen in America, of whom about twenty per cent. smoke, the evil effects seem to be very few. They rarely smoke excessively, and it has been shown "from overwhelming testimony given before the Congressional committee that Chinamen, placed side by side with American, Irish, and British miners, do more than they in a given time on the hardest kinds of work."

The Truth about Opium. By William H. Brereton, late of Hong Kong, Solicitor. London: W. H. Allen and Co. 1882.

The two books just noticed refer to Indian and to American experience. The present deals with China itself. The writer of this notice has had opportunities for immediate observation among the Chinese, and does not hesitate to say that European opinion is much astray on the general subject. The truth is that the Anti-Opium Society has got the public ear, and, being greatly prejudiced itself, has forced its opinions on those who have no means of forming conclusions of their own. The Society has great names in Church and State on its side, and these advocates, taking their text from the biassed reports of missionaries, confuse opium-eating with opium-smoking, form their ideas of the latter from descriptions of the opium-dens to be found in the low slums of every town where Chinese are settled, and finally believe that every opium-smoker is a slave to the habit. An opium-den is not a lovely sight, but it is more the loathsome accompaniments than the smoking of opium itself that render it so repellent. Such dens are frequented by the lowest scum of the population, and to see them a European must usually go under the escort of a policeman, a preliminary which naturally does not tend to raise a favourable prepossession. Yet who would form his ideas on the general question of the use of stimulants in England from the inspection of a London gin-palace? The conclusions arrived at could be no less delusive than those of the Anti-Opium Society. Respectable Chinamen smoke their opium-pipes at home after business hours, and those who have had transactions with Chinese merchants are best able to judge whether it affects them mentally or bodily. Few Chinamen who can afford it go without their evening pipe, and yet, for physical energy and acuteness in business, they are unequalled in the East, and hold their own well with Europeans. The present writer can speak from personal experience of the soothing effect of an opium-pipe on the body wearied with a long tramp through the jungle, as well as on the mind strained with harassing work in a tropical country, and most assuredly prefers opium to tobacco in such cases. As a preventive or an alleviative of the pains of jungle fever, agues, and other like diseases, the value of the narcotic is well known, and the so-called victims of opium to be seen in the Tung Wah, the Chinese hospital in Hong Kong, are, for the most part, simply men who have taken to constant opium-smoking to procure release from the sufferings of disease. Mr. Brereton's book is well-timed, and it is ably and vigorously written. Perhaps he is too vigorous in his denunciations of the missionaries, in so far as their opinions on opium-smoking are concerned. These gentlemen move in too limited a circle to be able to form a just opinion on the habit, but they are perfectly sincere in their horror of it. The misfortune is that they are believed with so little examination. Perhaps we may not altogether go so far as Mr. Brereton when he says that opium is "not only perfectly harmless, but most beneficial, so that it will not only put down spirit-drinking, but supersede tobacco altogether." That is partisan enthusiasm; yet, apart from a few extreme statements such as this, *The Truth about Opium* is a valuable contribution to the right understanding of the Opium Question.

Nitro-Glycerine in Angina Pectoris. By William Murrell, M.D., M.R.C.P., Lecturer on Materia Medica and Therapeutics at the Westminster Hospital; Senior Assistant-Physician to the Royal Hospital for Diseases of the Chest. London: H. K. Lewis. 1882.

Dr. Murrell here brings together his already partly-published experiences of nitro-glycerine in the treatment of angina pectoris. Experiments show that its action is almost identical with that of nitrite of amyl; in small doses it gives rise to a throbbing and sense of fulness in the temples and head, a quickened pulse, perspiration, and sometimes nausea. A series of sphygmographic tracings exhibit the action of nitro-glycerine and nitrite of amyl on the pulse. The effect produced is the same in both instances, namely, quickening, dicrotism, and diminished tension. Nitro-glycerine takes a little longer in producing its action than the nitrite of amyl, but the full effect is maintained for a longer period, the influence of nitrite of amyl being extremely transitory. For this reason Dr. Murrell considers nitro-glycerine to be preferred. He gives notes of twelve cases, most of them uncomplicated by valvular disease or aneurism; in all of them nitro-glycerine diminished the pain, and in some afforded very permanent relief. In a few, cardiac complications were present, and more or less good effect was produced by the exhibition of the drug. In the rest the result was doubtful. With regard to the mode of administration, Dr. Murrell recommends that a one per cent. solution should be used, and a half minim given every three hours, to be increased as required. Some patients are very susceptible to its action, while others bear well the largest doses. Dr. Murrell's results taken in combination with those of Mr. Green, published in the February number of the *Practitioner*, go to show that nitro-glycerine is a very valuable remedy, with the additional advantage that its physiological action is definite and known.

On Chorea, and Other Allied Movement Disorders of Early Life. By Octavius Sturges, M.D., F.R.C.P. 8vo. pp. 198. Smith, Elder and Co. 1881.

Chorea is a disease full of interest. Its pathogeny, pathology, and treatment are alike the subject of lively controversies ; and its frequency makes it the duty of every medical practitioner to follow the progress of our knowledge concerning it. Dr. Sturges' little volume is a most readable *résumé* of the present state of the question, and contains the outcome of much personal research. Passing over the chapters containing the general description of the disease, we come to the moot point of the correlation between chorea and rheumatism. The author's conclusions are that there is no real connection between chorea and ordinary "rheumatism," though there is some direct relationship between chorea and acute rheumatism with heart complications in the cases where these are present. We think he has established these points satisfactorily. Heart-disturbance is to be ascribed to a choreic condition of the cardiac muscle. He shows that there is no causal *nexus* between the post-mortem appearances observed in the few fatal cases on record and the disease itself—and proceeds to discuss the various pathological hypotheses concerning chorea, which are, he thinks, to be considered as so many attempts to accommodate this particular affection to the pathological doctrines of the day. Chorea is a functional disease, and the chapters in which he discusses this view are highly interesting. He draws an excellent parallel between the movements of the young infant and those of the choreic patient. He draws attention to the prevalence in older patients of psychical disturbance—a fact of great importance. With reference to treatment, he asserts the uselessness of all medication, trusting to hygienic and moral influences chiefly. Arsenic he finds of no value though praised by others. "Why, I say, should the very same drug have virtue from the hands of one and no virtue at all from the hands of another? What makes the difference? It cannot be the drug, it must be the hands." To this we reply *non sequitur*. It may be the *dose* : and we have noticed that good results from the administration of arsenic in chorea depend above all upon the dose. It must be such as to produce distinctly toxic effects. To obtain these a drachm or more daily of Fowler's solution may be required. The orthodox maximal dose of five drops is inert.

We thank Dr. Sturges for the pleasure and benefit we have derived from the perusal of his thoughtful volume.

Clinic of the Month.

Hyperpyrexia in Acute Rheumatism.—A Committee of the Clinical Society on this subject sum up their deliverances as follows :— 1. That cases of hyperpyrexia in acute rheumatism appear to prevail at certain periods, having in the last decade been remarkably numerous in the years 1873-76, whereas latterly they appear to have been much less frequent. That such excess corresponds in a certain degree, but not in actual proportion, to a similar excessive prevalence in acute rheumatism generally. That the largest number of cases of hyperpyrexia arose in the spring and summer months, whereas rheumatism is relatively more common in the autumn and winter. 2. That whilst very little difference obtains between the two sexes in regard to proclivity to rheumatism, the proportion of males to females exhibiting hyperpyrexial manifestations is 1·8 to 1. But that as to age no such marked difference exists; nor as to occupation. 3. That the subjects of hyperpyrexia show no undue rheumatic tendency as regards family predisposition. 4. That cases of hyperpyrexia preponderate in first attacks of rheumatic fever. 5. That hyperpyrexia is not necessarily accompanied by any visceral complications, but may itself be fatal. The complications with which it is most frequently associated are pericarditis and pneumonia. 6. That the mortality of these cases is very considerable, hyperpyrexia being one of the chief causes of death in acute rheumatism. 7. That although present in a certain number of cases, and then of much value from their prodromal significance, neither the fact of the abrupt disappearance of articular affection, nor the similarly abrupt cessation of sweating, is an invariable antecedent of the hyperpyrexial outburst. 8. That the supervention of delirium or other symptom of nervous disturbance is very frequent, either antecedent to or simultaneous with the hyperpyrexia. 9. That there is considerable variability in the date of the occurrence and in the duration of the hyperpyrexial condition, ranging, according to our observations at least, from the fourth to the thirteenth day. 10. That when death results it has occurred mostly in the second and third weeks of the rheumatic attack. 11. That the post-mortem examinations in a certain proportion elicited no distinct visceral lesions, and that when present the lesions are not necessarily extensive. 12. That the prompt and early application of cold to the surface is a most valuable mode of treatment of hyperpyrexia. That the chances of its efficacy are greater the earlier it is had recourse to. That the temperature cannot safely be allowed to rise above 105°. That failing the most certain measure—viz., the cold bath—cold may be applied in various other ways: by the application of ice, by cold affusions, ice-bags, wet sheets, and iced injections.

The Committee did not think it advisable in the present report to enter into theoretical considerations, and limiting the study of hyperpyrexia to the records of sixty-seven cases of acute rheumatism, deemed it premature to enter into physiological reasonings until the same conditions had been reviewed in other acute febrile diseases. The report is signed by Drs. R. Southey, H. Weber, W.M. Ord, F. Taylor, T. Barlow, and S. Coupland.

Persistence of the Ductus Arteriosus.—Dr. Malherbe cites several cases in which this malformation existed without producing characteristic symptoms during life, and enumerates, on the other hand, the symptoms which may fairly lead us to suspect it when they do exist.

The presence of a rough prolonged murmur, systolic, or changing from systolic to diastolic, and having its maximum intensity at the level of the third left costal cartilage, and propagated up towards the left clavicle, justifies the diagnosis of persistent ductus. The murmur may be accompanied by either a general or a local cyanosis. It differentiates itself from that caused by an immediate communication between the pulmonary artery and the aorta, inasmuch as the latter produces a murmur of an intense thrilling character heard all along the hollow of the back, and loudest of all at the level of the transverse aorta (third and fourth dorsal vertebrae).

Persistent ductus is compatible with perfect development, strength, health, and long life.

One case quoted (aged 28) was highly cyanotic, yet the patient was capable of severe and prolonged toil without respiratory difficulties. Another, a lady of 50, had never complained of anything leading to suspicion of malformation, which was only discovered post-mortem. (*Journ. des connais. méd.*, Nov. 1881.)

Treatment of Diphtheritic Paralysis.—In a lecture at the Hospital for Sick Children (*Gaz. des Hôp.*), M. Archambault has described the therapeutic indications which should guide the physician in the treatment of diphtheritic paralysis. The subjects of this disease being generally weak and anæmic, the first indication is to have recourse to preparations of iron, such as syrup of iodine of iron, and especially iron pills, which are more easily swallowed than liquids ; quinine is also indicated. To excite muscular contraction, tincture of nux vomica should be administered as a draught in progressive doses, commencing by ten drops, and being increased to fifteen to twenty drops a day. Dry friction on the skin, or with a piece of wool impregnated with benzoin, is also prescribed to stimulate nutrition and arouse sensibility. The baths of Barèges are also an excellent stimulant. Residence at the sea side and sea-bathing give good results in patients in whom these paralytic symptoms last for several months. To these different methods, M. Archambault adds the employment of electricity in continuous currents, which he considers as having a better effect on nutrition than intermittent currents. Finally, when it is absolutely impossible to feed the patient by the ordinary methods, on account of the danger of fits of suffocation, he has recourse either to the œsophageal sound or to nutrient injections. In reference to the ocular troubles, of which it is not generally very necessary to take much note, M. Archambault prescribes, when they have a certain persistency, a collyrium composed of ten centigrammes of sulphate of eserine in thirty grammes of distilled water. (*Lond. Med. Record*, May 15, 1882.)

Prognosis in Diabetes.—Dr. R. Schmitz, of Neuenahr, discusses six hundred cases of diabetes treated by him for the most part dietetically. He says the question of prognosis is determined by (1) the earliness of the discovery and treatment of the complaint ; (2) the strictness with which the antidiabetic regimen is observed ; (3) the etiological factors ; (4) the age of the patient ; (5) the degree of immunity the patient enjoys when he chances to use sugar-breeding food. In early cases the prognosis is favourable. Diabetes depending on central nervous lesions or on grave chronic affections is serious : depending on worry, pain and grief, or on over-use of sugary food, it is less so. Gouty diabetes has the best prognosis of all. After the age of thirty the prognosis grows steadily worse. It is bad if sugar persists on an exclusive diet of fish and flesh. It is decidedly favourable if eggs, salads, and mild cheese can be taken without breeding sugar, which only reappears when fruits, starchy roots, starch or cane sugar are taken. (*Wiener med. Wochenschr.* No. 11, 1882.)

The Trance State in Inebriety.—Dr. Crothers, of Hartford, has published a paper read before the New York Medico-Legal Society in which he relates and comments upon several cases of prolonged automatism in excessive drinkers. He states that loss of memory and consciousness may come on in inebriety at a time when there is little or no evidence of the person being drunk. A state of automatism may last from a few moments to several days. Dr. Crothers finds that this trance state is always associated with a particular neurotic condition either brought on by or preceding drunkenness.

The Nutrient Treatment of Insanity.—"The greater my experience becomes," writes Dr. Clouston, "I tend more to substitute milk for stimulants. I don't undervalue the latter in suitable cases; but in the very acute cases, both of depression and maniacal exaltation, where the disordered working of the brain tends rapidly to exhaust the strength, I rely more and more on milk and eggs made into liquid custards. One such case this year got eight pints of milk and sixteen eggs every day for three months, and under this treatment recovered. I question whether he would have done so under any other. He was almost dead on admission, acutely delirious, absolutely sleepless, and very nearly pulseless. It was a hand to hand fight between the acute disease in his brain and his general vitality. If his stomach could not have digested and his body assimilated enough suitable nourishment, or if he could not have been taken out freely into the open air, he must have died. But to-day he is fulfilling the duties of his position as well as he ever did in his life. All acute mental diseases, like most nervous diseases, tend to thinness of body, and therefore all foods, and all medicines, and all treatments that fatten, are good. To my assistants, and nurses, and patients, I preach the gospel of fatness as the great antidote to the exhausting tendencies of the disease we have to treat, and it would be well if all people of nervous constitution would obey this gospel." (*Annual Report of the Royal Edinburgh Asylum for the Insane*, 1881.)

Acute Glaucoma induced by Duboisia.—That atropia instilled into an eye may excite an attack of acute inflammatory glaucoma is generally accepted by ophthalmologists as an established clinical fact. An inference which may properly be induced from this is that all drugs belonging to the mydriatics may likewise cause this morbid state to appear. A practical illustration of this as regards duboisia is presented in the history of a case, the first, so far as we are aware, on record, reported by Dr. Albert G. Heyl, in which, following the instillation of duboisia, acute inflammatory glaucoma was speedily developed in an eye in which a simple glaucoma already existed. (*American Journal of the Medical Sciences*, April, 1882.)

Mitral Præsystolic Cardiac Murmurs.—From a careful clinical study of the varieties, mechanism, and clinical significance of mitral præsystolic murmurs, Prof. Austin Flint draws the following conclusions :—

1. There are two varieties of this murmur, which are distinguished by differences in quality and in mechanism. One variety is a rough, and the other is a soft, murmur. 2. The roughness in the first of these varieties is characteristic, and may be distinguished as vibratory or blubbering. The softness of the second variety is bellows-like, like other soft cardiac murmurs. It may vary in pitch and intensity, but as a rule, it is low and weak. 3. The rough murmur is due to vibrations of the curtains of the mitral valve, caused by the passage of blood from the auricle to the ventricle. The soft murmur, like other bellows murmurs, may be due either to contraction of the orifice through which the blood passes, or to roughness of the surface over which it flows. 4. A rough præsystolic murmur denotes a mitral obstructive lesion, the obstruction due to adhesion of the mitral curtains leaving a contracted orifice, the curtains remaining flexible. A præsystolic soft murmur denotes either a contracted orifice or roughness of the endocardial membrane. 5. A rough præsystolic murmur, exceptionally, is produced when there is no mitral lesion, aortic regurgitation existing whenever the murmur is thus produced. The production of this murmur without mitral lesion may be explained by the physical conditions incident to aortic regurgitation, taken in connection with the mechanism of the murmur. 6. A rough mitral præsystolic murmur is not always present in connection with contraction of the mitral orifice, and by reference to the physical conditions, together with the mechanism of the murmur, its absence in certain cases may be satisfactorily explained. 7. A soft mitral præsystolic murmur is a very rare physical sign. A rough mitral præsystolic murmur, on the other hand, is by no means rare, although less frequent in its occurrence than the mitral systolic, the aortic direct, and the aortic regurgitant murmurs. 8. Mitral lesion giving rise to præsystolic murmur is sometimes tolerated for a much longer period than appears to be generally supposed. (*American Journal of the Medical Sciences*, April, 1882.)

Phthisis without Sputa.—Dr. H. A. Lediard gives the history of two cases, men aged respectively fifty-three and twenty-nine, in whom, during the whole course of their illness, there was never any expectoration. It was a remarkable coincidence that both lived exactly four months from the commencement of the disease. In neither was there any hæmoptysis, and scarcely any cough. Unfortunately, in neither was a post-mortem examination possible. Dr. Lediard compares such cases to the destructive process in the joints known as "caries sicca." The absence of sputa is evidently not at all a favourable sign in this form of disease. (*Med. Times and Gaz.*, April, 1882.)

Electrical Treatment of Angina Pectoris.—Dr. Löwenfeld relates a case of angina pectoris in which galvanisation proved beneficial. The patient, a man aged forty-seven, was subject to attacks of the disease occurring every month or two. These were characterised by excited respiration, oppression, small frequent pulse, sternal pain radiating to the left arm, and convulsive tremors of the limbs, and lasted about one hour. The heart was normal. The constant current was applied for one minute to each side of the neck along the course of the pneumogastric. The sense of oppression was immediately relieved. Ten such applications in the course of three weeks were followed by complete freedom from the attacks for more than two years. (*Aerztl. Intelligenzbl.* No. 39, 1881.)

Internal Use of Chrysophanic Acid in Psoriasis.—Dr. Napier, of Glasgow, has been experimenting with chrysophanic acid given internally in cases of psoriasis. The results are encouraging. In some obstinate cases, which had resisted arsenic and external applications, small doses of the acid rubbed up with sugar of milk were administered after each meal. Half a grain is a good dose to start with, and this may be gradually increased until signs of gastro-intestinal disturbance appear. Patients vary much in their tolerance of the drug;—a girl of 13, in Prof. Charteris' ward, took nine grains a day in one-grain pills without trouble; others soon reach their maximum dose, and then the treatment must be suspended or the amount reduced. In nearly all the cases the improvement in the skin disease has been marked and rapid. The greater ease and cleanliness of this mode of application of the remedy are obvious. In the interests of all it is desirable that the favourable conditions and methods of administration should be fully made out. (*Glasgow Med. Journ.* June, 1882.)

The Localisation of Intestinal Catarrh.—An extensive series of observations has recently been made by Professor Nothnagel for the purpose of discovering the influence of locality upon the symptoms which attend inflammation of the bowels. As a result of these observations Professor Nothnagel is able to affirm that scybala found embedded in mucus are a certain indication of intestinal catarrh, and that they are only met with when the disease is below the splenic flexure. The absence of mucus, however, does not imply the absence of catarrh of the lowest part of the bowel. Catarrh of the small intestine with or without implication of the ascending portion of the colon is characterised by the passage of soft (not liquid) stools, apparently uniform, but presenting under the microscope numerous clear islets of pure mucus. If the lower half of the colon be affected the mucus is found not only in the substance of the fæces but on their surface. The presence of unaltered bile pigment is invariably found post-mortem to be associated with catarrh of the jejunum and ileum. It implies an increased peristaltic action, which must, however, involve not only the small intestine, but also the colon throughout its entire length. The presence of unaltered fragments of food in the fæces is likewise of diagnostic importance in relation to the small intestine. Intestinal catarrh does not increase the amount of digestible food thus evacuated unaltered, and an excess, therefore, only points to such catarrh when other indications are present at the same time. The physical examination of the abdomen furnishes but scanty indications for the localisation of enteric catarrh. The indican excreted in the urine is increased in quantity in the majority of cases of intestinal catarrh and diarrhœa, but very often also in cases where there is no intestinal affection. When the colon only is affected, no excess of indican is observed so long as the general condition of the patient is good: on the other hand in all cases in which there is a decided catarrh of the small intestine, the indican is increased. (*Zeitschrift f. klin. Medicin—The Lancet*, March 4, 1882.)

Aural Vertigo.—Dr. Burnett, of Philadelphia, has a good article on this subject, of which the following is a brief abstract:—The name implies a vertiginous disorder due to an irritation of auditory apparatus. The irritation, though originating in different parts of the organ of hearing, must be exerted ultimately in the form of pressure upon the terminal filaments of the auditory nerve in the semi-circular canals, by which means a stimulus is conveyed to the cerebellum. The symptoms of aural vertigo are tinnitus and hardness of hearing, which is followed by dizziness passing rapidly into pronounced vertigo with reeling and falling, accompanied by nausea, and vomiting, and faintness, but rarely with loss of consciousness. When the irritation is in the external ear neither the tinnitus nor the deafness may be excessive, but both are permanent from the outset of the disease to the cure. When the irritation lies in the middle ear the symptoms are likely to be paroxysmal. Vertigo dependent upon disease of, or pressure upon, the auditory nerve is usually not paroxysmal, the patient experiencing a constant and increasing tendency to alteration in gait, with a disposition to fall towards the affected side whilst walking. The aural symptoms, and the absence of loss of consciousness, render the diagnosis of auditory vertigo from stomachic vertigo, so-called biliousness, epilepsy, and even apoplexy, a matter of no great difficulty. The treatment of aural vertigo must be causal; if it be due to pressure from the presence of a foreign body in the auditory canal, syringing with warm water until the foreign body be removed will be effectual. If the irritation be due to pressure from matter accumulated in the drum cavity, it must be allayed by the removal of the retained mass, either by *paracentesis tympani* or by Politzer's air bag, or catheterisation. When the pressure is due to a vacuum in the tympanum from closure of the Eustachian tube, the same remedial measures will be of service. In cases of tonic spasm of the tensor tympani muscle the attacks may be relieved by inflation of the drum cavity, and by the continued use of potassium bromide. Vertigo due to chronic aural catarrh will also require appropriate remedies: as will also those forms which result from general disorders of the circulation—anæmia or plethora. (*Philadelphia Medical Times*, June 3, 1882.)

Chlorinated Oil in Scabies.—At the American Hospital for Skin Diseases, chlorinated oil, a yellowish oily fluid prepared by passing chlorine gas into olive oil, has been found to be a most decided parasiticide, more particularly in scabies. In this affection a piece of cotton is saturated with the chlorinated oil and applied night and morning. The preparation is also used in other cutaneous diseases. (*Medical Bulletin*, Feb., 1882.)

Oil of Peppermint in Zona.—Dr. Meredith writes:—I have found the oleum menthæ pip. more effective than any other form of anodyne application I have tried in allaying the neuralgic pains so often piteously complained of in cases of herpes zoster. These distressing pains—worse in elderly people—are complained of often when the eruption has disappeared; but painting the affected parts over with oleum menthæ pip. nearly always affords speedy relief. I have painted the oil over the eruption when it was out in a fresh florid condition, and that with great relief to the patient. The value of this application in pains of neuralgic character deserves to be better known than it is. (*Birmingham Medical Review*, June, 1882.)

Extracts from British and Foreign Journals.

Sulphuretted Hydrogen in Tuberculosis.—Prof. Arnoldo Cantani has been experimenting with sulphuretted hydrogen in the treatment of tuberculosis. The reputation of certain sulphur-springs, as well as the known properties of the antiseptic, led him to regard the treatment as hopeful. He administers the gas partly in solution and partly by inhalation in a special chamber. He finds so far, that: (1) The inhalation of an atmosphere strongly impregnated with sulphuretted hydrogen can be well borne for a considerable time by most patients; those who find it irksome at first soon get used to it. (2) The patients usually become free of fever in a day or two. (3) The local changes appear not to increase, and the cough becomes less. (*Centralb. f. med. Wissensch.* April 22, 1882.)

Condurango in Abdominal Cancer. — Dr. Hoffmann reports the results of treatment with condurango bark in the hospital at Basle. The observations have extended over three years and relate to some twenty cases. It is found that the preparations of condurango are not serviceable in all forms of cancer, and occasionally are quite without effect. In some cases, however, demonstrable benefit follows their use. Certain symptoms, such as emesis, pain, anorexia, emaciation, are in the great majority of cases decidedly ameliorated. Further observations are much to be desired. (*Centralb. f. med. Wissensch.* April 15, 1882.)

Burnt Alum in Ague.—Baboo Brojendra Nath Banerjee states that this is a very cheap, easily procurable, and efficient antiperiodic medicine. The value of alum is chiefly marked in cases of fever in which the attacks come on with clock-work regularity. It generally fails in irregular types of intermittent fever. Two doses are generally sufficient to complete the cure. Eight grains of burnt alum are to be given in each dose. The first dose is to be given three hours and the next an hour before the expected attack of fever. (*Indian Medical Gazette,* January 2, 1882.)

Iodine in Malaria.—Dr. R. B. Morison reports that he has treated with very great success two hundred and fifty cases of acute malarial poisoning by administration of tincture of iodine. The dose he employs is fifteen minims (not drops) three times a day, made up with sugar and gum and largely diluted. It is taken a quarter of an hour before meals. In cases of chronic malarial poisoning he found by experience that iodine has no especial action. Constipation, pregnancy, or lactation do not contraindicate the use of the remedy. (*Maryland Med. Journal*, Feb. 15, 1882.)

Baboo Brojendra Nath Banerjee used tincture of iodine, in 1879, in more than 500 cases, and thought that many of them were cured as if by magic. In 1880 he again tried it, but with less success. The cause of this discrepancy in his results was that he had at first overlooked the fact that in every malarial epidemic there are many cases of ephemeral or one-day fever, with a temperature of 105° or 106° F., a pulse of 120 or 130, quick and laboured respiration, intense headache, and even delirium. In these cases there is only one febrile attack which does not recur. When medicine is given in such cases, the non-recurrence of the attack is ascribed to the medicine, and whatever happens to be given appears to cure the fever. Intermittent fever also tends to spontaneous cure on the third, fourth, fifth, and even seventh or eighth day. Old women in the country villages of India are acquainted with this fact, and wait until the third day before they give medicine. His experience since he became acquainted with ephemeral fever and the spontaneous cure of intermittent fever has shown him that while iodine may cure about 55 per cent. of malarial cases it cannot rival quinine. In many respects it is much inferior to it. There are very few persons who cannot tolerate quinine, whereas iodine disagrees with many. It cannot and never should be given when there is nausea or vomiting and burning of the skin. It is certain to aggravate these symptoms fourfold and make the patient nearly mad. Distressing symptoms are sometimes produced by iodine. It produces flushing of the face, severe vomiting and retching, intense burning of the skin, formication, injection of the conjunctivæ, and coryza. (*Indian Med. Gazette*, Jan. 2, 1882.) [*Pract.* xxvi. 49: xxvii. 57.]

Action of different kinds of Aconitine and Pseudaconitine on Muscles and Nerves.—Prof. Plugge has compared the action of seven specimens of aconitine from different makers in order to ascertain their comparative activity, and to discover if possible the reason of the discrepancy between the statements of different authors in regard to its physiological action. The specimens employed were :—(1) Nitrate of aconitine from Petit —hard white crystals ; (2) nitrate of aconitine from Morson (pseudaconitine)—a yellowish-brown powder ; (3) nitrate of aconitine from Hollot—a white powder ; (4) nitrate of aconitine from Hopkin and Williams (pseudaconitine ?)—agglomerated transparent greenish-brown gum-like mass ; (5) nitrate of aconitine from Merck—a yellow light-brown powder ; (6) sulphate of aconitine from Schuchart—a greyish-white powder ; (7) nitrate of aconitine from Friedländer (Trommsdorf)—an agglomerated greyish-white mass. The most active of these is Petit's, which is even more powerful than Morson's, and the weakest is Friedländer's. In regard to their mode of action he finds that :—(1) Aconitine and pseudaconitine paralyse the peripheral intramuscular terminations of the motor nerves, and in this respect resemble curare. This action occurs equally in the *Rana temporaria* and *Rana esculenta.* (2) They do not paralyse the nerve trunks. (3) They do not paralyse the sensory nerves, or, at any rate, only to slight extent. (4) The symptoms of paralysis which they produce are due to the action of the drug on the peripheral ends of the motor nerves, and Bœhm and Wartmann's idea that they are of central origin lacks proof. (5) The muscles retain their irritability even after poisoning by doses of aconitine five or ten times as large as those which suffice to paralyse the nerves. The resemblance between aconite and veratria, noted by Weyland, does not exist. The aconitine muscle-curve does not differ in any respect from the normal. The following symptoms were less exactly studied :—(6) Fibrillary muscular twitches were rarely observed and are by no means a constant phenomenon. (7) Dilatation of the pupil occurs frequently but not constantly. (8) Increased secretion of mucus from the skin was frequently observed. The various preparations of aconitine differ much in the amount of mucus-secretion which they occasion. (9) Respiration soon becomes laboured, and after a few minutes ceases entirely. This is a very constant symptom. (10) Gaping and retching occur almost invariably both in *Rana temporaria* and *esculenta,* and form a tolerably constant indication of aconitine poisoning. The violence of the vomiting varied with the kind of aconitine. (11) The blood of the poisoned animal is usually of a dark violet-red colour, so that the distended veins appear black. Schuchart's and Friedländer's preparations caused but slight alteration in the colour of the blood, and differed in this respect from the others. (12) The heart finally stops in diastole, distended with dark violet-red blood, the auricles continue to pulsate longer than the ventricle. Neither electrical irritation of the vagus nor of the venous sinus will arrest the beats of the poisoned but still pulsating heart. On the other hand, electrical irritation applied to the heart just after it has ceased to beat will cause it to recommence. (*Virchow's Archiv.* March 1882, p. 410.)

Transient Albuminuria.—Dr. F. P. Kinnicutt thinks that temporary albuminuria, as it occurs in children and adolescents in apparent health, may be traced in a large number of instances to a transient oxaluria or lithuria, and suggests that the sequence of events in the causation of the albuminuria is as follows:—(1) The temporary presence of a large amount of imperfectly oxidized matter in the circulation. (2) A disturbance of the general nervous system in which the vaso-motor system of the kidney shares, or one confined to the vaso-motor system of the kidney in its elimination of these products of a faulty digestion. (3) A transient dilatation of the blood-vessels of the kidneys and a retardation of the blood-current in the glomerular vessels, with a consequent possible alteration in the functions of the globular epithelium also of a temporary nature. (*Archives of Med.*, Feb. 1882, p. 58.)

Abdominal Method of Singing and Breathing as a Cause of Female Weaknesses.—Dr. Clifton Wing draws attention to the fact that the tissues which support the uterus being chiefly elastic and not contractile, they are incapable of being strengthened like ordinary muscles by exercise. Muscular development is, therefore, no safeguard against prolapse and gymnastic exercises instead of remedying actually increase a tendency to it. He has observed several cases in which uterine displacement was caused by the abdominal method of singing or speaking, in which abdominal respiration is chiefly employed instead of thoracic. Greater pressure is exerted upon the uterus by this method, especially when an attempt is made to contract an already retracted abdominal wall, the inspiration having been limited to a superficial thoracic respiration. This effect is greatly increased by the restrictive action of close and unyielding corsets. (*Reprint* from *Boston Med. and Surg. Journal.*)

The Bacterium of Pemphigus.—M. Paul Gibier has found micro-organisms in the serum which fills the bullæ in acute pemphigus and in the urine of the patients. The parasite is found in chains of rounded elements, which show active movements. It is reproduced by cultivating the serum or the urine. The author has not found it transmitted by contagion, and attempts to propagate it by inoculation have so far failed. The affection is easily cured by the usual anti-parasitic remedies. (*Annales de dermatologie et de syphiligraphie,* vol. iii. No. 2.)

Chloroform as an Anthelmintic.—Dr. Semple cites cases in which the following mixture effected the rapid evacuation of lumbricoides. He regards it as a most certain anthelmintic :—

℞ Chloroform, ʒj.
Castor-oil, ℥j.
Croton-oil, ♏j.

Mix well: dose from ʒss. to ℥ss.
(*Virg. Med. Monthly*, viii. 10.)

Mercurial Salivation.—For the prevention of salivation, Prof. Panas prescribes the following powder, with which the gums should be rubbed ten or twelve times a day during treatment with mercury :—Powder of cinchona, three parts; powder of rhatany and powdered chlorate of potash, of each one part. (*Jour. de Thérapeutique*, Feb. 10, 1882.)

Atropine in Mania.—J. R. Gasquet, M.B., has found atropine useful in cases which had been previously found to be benefited by hyoscyamine. He recommends the employment of the drug on account of its comparative safety and cheapness. (*Journal of Mental Science*, April, 1882.)

Resorcin.—According to Dujardin-Beaumetz and Cullias, resorcin acts in the proportion of 1 to 100 as an anti-ferment, and of 1·5 to 100 as an antiseptic. It is poisonous, though not so much so as carbolic acid. In doses of thirty to sixty centigrammes for every kilogramme of body-weight it produces trembling and tonic convulsions, quick respiration and pulse, without impairing sensibility or consciousness. In an hour these symptoms disappear. Sixty centigrammes for each kilogramme cause giddiness, lessened sensibility, and loss of consciousness, with violent and frequent clonic convulsions, which affect the anterior part of the animal. The pupils are dilated, respiration and circulation much accelerated, the temperature but little affected. In one or two hours these symptoms disappear. In quantity of ninety centigrammes to one gramme to each kilogramme similar symptoms appear, which are, however, not so violent in the limbs. There are tetanic contractions of the muscles of the neck. The temperature rises gradually, and, without exception, to 41° C. at the moment of death, which occurs in about thirty minutes. There is no general tetanus. Rigor mortis sets in about fifteen minutes after death. This shows that resorcin excites the central nervous system. It has no action on the blood, except when brought into actual contact with it. It may be used internally and externally in all diseases due to contagious germs. Its anti-rheumatic, febrifuge, and anti-pyretic power requires further study. As it has no smell, is very soluble, and is less poisonous and less caustic than carbolic acid, further experiments with resorcin as a substitute for carbolic acid are desirable. (*Rép. de Pharm.* 1881, p. 526.) [*Pract.* xxvii. 381 : xxviii. 458.]

Aphonia of Singers and Speakers.—For this affection Dr. Corson recommends the patient to put a small piece of borax (two or three grains) into the mouth and let it dissolve slowly. An abundant secretion of saliva follows. Speakers and singers about to make an unusual effort should the night before take a glass of sugared water containing two drachms of potassium nitrate (saltpetre) in order to induce free perspiration. In similar circumstances this gargle may also be used :—

℞ Barley water, six ounces.
Alum, one or two drachms.
Honey, half an ounce.

Mix, and use as a gargle.

Or, again, an infusion of jaborandi, made by putting two scruples of the leaves in a small cup of boiling water, may be drunk in the morning before getting up. The free sweating is said very quickly to restore the strength of the voice. (*Revue Médicale,* April 12, 1882.)

Hysteria.—Dr. Goodell says: When called to treat a young girl with an hysterical attack there are three things which you had better do: (1) Institute at once firm pressure in the neighbourhood of both ovaries. This is very apt to quiet the patient at once. (2) Administer an emetic. I have found that a woman who is well under the action of an emetic has not the opportunity to do anything else than be thoroughly nauseated. Give a full dose of ipecac. with one grain of tartar emetic. (3) And this method of controlling the spasm will often act charmingly : Take a good-sized lump of ice and press it right down on the nape of the neck. This produces quiet by its powerful impression upon the whole nervous system. (*Canada Med. and Surg. Journal,* May 1882.)

The Physiological Action of Blood-letting.—The unquestionable effect of local depletion in relieving some forms of inflammation appears to have been confirmed and explained by the recent researches of Dr. Genzmer, of Halle (*Centr. f. d. Med. Wiss.* April 1, 1882). This observer has found that when inflammation has been set up in the web of the frog's foot in the usual way—say by means of a hot wire or by caustics—and the process is watched under the microscope, it is possible to remove the stasis, to empty the blocked vessels, and so far to relieve the inflammation by applying a leech to the limb of the animal between the lesion and the heart. The actual phenomena attending the resolution of the inflammatory process prove, however, to be the very opposite of what might have been expected. Instead of producing anæmia of the affected area, leeching leads to hyperæmia of the part by drawing the blood from the blocked vessels, and allowing a full and rapid stream to flow once more through them. Thus the leucocytes, clinging to the walls previous to diapedesis, are swept away in the blood-current, and one of the elements of inflammation is rapidly removed. But the abstraction of blood causes more than simple resolution. It is manifest that the free influx of blood into the inflamed area—that is, the hyperæmia—must restore the nutrition of the part, the reduction of which constitutes another of the factors of inflammation. Whether or not the leucocytes which may have already escaped from the circulation into the tissues pass back into the vessels, Dr. Genzmer is unable to say. Results similar in kind, but less marked in degree, followed scarification, instead of leeching, between the inflammatory focus and the heart. Distant venesection produced a decidedly less marked influence. The results of these observations are unquestionably valuable, but their importance must not be exaggerated. In the first place, as Dr. Genzmer remarks, they account for the effect of leeching *above* the seat of inflammation, not *at* or *over* it; secondly, they cannot be said to apply to venesection in visceral inflammations; and thirdly, they do not explain the action of leeching or of venesection in the cases where these measures are clinically practised with most success—for example, in cardiac distress or in uræmia. It is possible that the antiphlogistic effect of a poultice in inflammation may be the same as the local effect of leeching which has just been described, namely, the reduction of stasis and the promotion of a free flow of blood through the damaged tissues. (*Med. Times and Gazette*, May 13, 1882.)

A New Ptosis Operation.—The insufficiency of operations hitherto proposed for the relief of complete or nearly complete ptosis, with little or no power in the levator, is well known. Pagenstecher has devised an operation which depends for its effect on bringing the frontalis to act directly on the upper lid, and thus substituting the action of this muscle for that of the levator. This is accomplished by producing a superficial vertical cicatrix connecting the frontalis with the edge of the lid. A needle is entered about a finger's breadth above the supraörbital ridge and carried downward beneath the skin to emerge at the level of the lashes; a thread is drawn through and the ends tied together without much dragging. Each day the thread is pulled on till it finally cuts its way out. The reaction is very moderate;

the disfigurement caused by the scar is very little, and much more than made up for by the improvement in appearance obtained by relief of the ptosis. Pagenstecher has found one suture suffice in the cases operated on, but suggests that two may sometimes be necessary. For incomplete ptosis a modified form of procedure is advised. A thread armed with two needles is used. One needle is passed under the skin of the lid, parallel to and near the lashes, for a distance of one or two millimetres, drawn through, reëntered at the point of exit, and carried upward beneath the skin to a finger's breadth above the supraörbital ridge. The other needle is then carried from the point where the first needle entered, also upward, to emerge at the same place as the first above the brow. The two ends of the thread are drawn moderately tight and fastened. The loop thus formed may be removed after a longer or shorter time, or allowed to cut itself through, according to the indications of the individual case, and in this way a wholly subcutaneous cicatricial cord is produced. Care should be taken not to sink the needles so deeply above the brow as to wound the periosteum, lest a connection between the skin and periosteum might occur and prevent movement of the vertical cord. (*Archiv für Augenheilk.* xi. 2.)

Iodoform in Toothache.—Schaff recommends iodoform on account of its gently caustic action as an anodyne application to exposed tooth-nerves. The circumstance that a single or repeated application of iodoform does not produce any irritation, much less any inflammation of the periosteum, and the double function of the remedy as a cleansing and disinfecting agent, make it especially appropriate as a caustic, particularly before the introduction of a temporary filling. The author uses a paste consisting of

Iodoform powder	grs. 60
Kaolin	„ 60.
Carbolic acid	„ 8.
Glycerin	q. s.
Oil of peppermint	gtt. 10.

Triturate the iodoform, kaolin, and oil of peppermint with enough glycerin to form a thick paste. (*Deutsch. Med. Zeit.*, No. 12.)

Caution in the Use of Iodoform.—Dr. Sands, after taking a general review of the results of the employment of iodoform, and describing two cases of mania that had resulted from its use in his own practice, goes on to say that it has not as yet been ascertained what amount of it is necessary to induce poisoning. Susceptibility to its action varies greatly, for while in many cases two or three ounces have been applied to extensive open wounds immediately after operations, in others half an ounce and upwards may induce attacks of mania, and even a gramme give rise to slight nervous disturbance. In many of the German cases excessive quantities have been applied, sometimes amounting to five or six ounces. The effects depend much upon the extent of absorbing surface and the recency of the wound. Old persons are especially liable to suffer, while children seem to be much less so. "It is already apparent that the sanguine expectations at first entertained regarding the value of this antiseptic cannot be fully realised, and that in the present state of our knowledge iodoform should be employed with great caution, and in such a manner that it can be readily removed from the wound in case symptoms of poisoning should supervene. It is certainly hazardous to fill a large fresh wound with the powder, which may penetrate the meshes of the connective tissue so that it cannot be washed out. By employing it in the minimum quantity it will produce the desired effect, and by learning, perhaps, to recognise beforehand the class of cases that are peculiarly susceptible to its deleterious influence, we may yet be enabled to use with safety this antiseptic, which, in many respects, is the most valuable that has ever been introduced into surgical practice." (*New York Med. Record,* No. 12, 1882.)

Solvents of Iodoform.—According to Vulpius (*Archiv der Pharm.* xiv. 242, xvii. 44,) the most agreeable form of applying iodoform externally is its solution in collodion which may be made of any strength up to 15 per cent. Absolute alcohol and oil of turpentine dissolve 4 per cent., oil of lavender 7, and oil of caraway 16 per cent. Other essential oils have also a solvent power varying between these limits, and apparently connected with the proportion of oxygen each oil contains. Olive oil takes up 20 per cent. when hot, and retains 2 per cent. on cooling. (*Pharm. Journ. and Trans.* April 8, 1882.)

Charcoal in Eczema.—Chatterjee recommends for this disease an ointment made of two drachms of powdered animal charcoal to one ounce of freshly-prepared simple ointment. The charcoal is made from bones, leather, old shoes, and cuttings of horses' hoofs. It is specially useful in vesicular eczema of the limbs. (*Indian Med. Gaz.* April 1, 1882.)

Irritable Bladder in Women.—Dr. Etheridge defines this affection as a too frequent desire to empty the bladder, hyperæsthesia of the viscus being the ordinary condition present. The causes of the hyperæsthesia are intrinsic or extrinsic. The chief intrinsic causes are abnormalities of the urine such as oxaluria, diabetes, albuminuria, &c., or the presence in the excretion of abnormal substances not of urinary origin, such as pus, blood, foreign bodies, &c. Intrinsic causes also include various disorders of the urethra as well as of the bladder,—urethritis, new growths, stricture, dilatation, &c.; or, lastly, such affections as cystitis, cancer, polypi, cysts, tubercle, or even vesical hypertrophy. The extrinsic causes of irritable bladder are numerous, and are much more common than the intrinsic. Such are vascular excitement of the ovary, pressure on the bladder or urethra from the uterus, mental causes, &c. The treatment must therefore vary in each case according to the cause of the trouble. When the irritability is due to an excess of uric acid in the urine owing to affections of the digestive tract, a successful attempt to convert the uric acid into urea by the addition of another atom of oxygen can be made, by giving one quarter to one grain doses of permanganate of potash thrice a day. The alkaline carbonates neutralise uric acid excess by their direct action. Colchicum in small doses acts by improving digestion. Fruit acids are converted into alkaline carbonates in the blood, and become solvents of uric acid, or diuretics, and in this way are efficient aids in treating the uric acid excess. Many patients will be benefited by taking hot lemonade at bed-time, or by eating a lemon before breakfast daily, or by partaking liberally of acid fruit at breakfast and lunch times. Cases involving cystitis, acute or chronic, are troublesome enough. Some patients make rapid recoveries. But by far the larger majority of cases prove rebellious. The urine in these cases must be rendered alkaline as speedily as possible. Citrate of potassium, in as large doses as can be borne without causing stomachic distress, is an excellent remedy. The removal of existing constipation by daily laxative doses of mineral water upon rising in the morning is of importance, as it secures a systemic condition favourable to producing urine of minimum acidity, after which smaller doses of the citrate of potassium will suffice to produce alkalinity of the urine. At the same time the diet should be restricted to articles calculated to aid in avoiding acid excess in this excretion. An exclusive milk diet has cured cases of long standing and of great severity. Alkalies, minim doses of tinct. of cantharides hourly, twenty grain doses of bromide of ammonium, the solution of bromohydric acid, benzoate of ammonia in buchu, laxatives, proper diet, quietude, will relieve most cases of irritable bladder from acute cystitis. (*Virginia Medical Monthly*, Nov. 1881.)

Pettenkofer's Test for Bile Acids.—This test has been modified by E. Drechsel who recommends syrupy phosphoric instead of sulphuric acid. It is said to succeed best when used in the following way. Put about 5 cc. of syrupy phosphoric acid in a test-tube, add 2 drops of a fresh solution of cane sugar (1 : 4) and afterwards a drop of the solution containing biliary acids. Then set the test-tube in the neck of a flask containing boiling water. In a short time the surface of the liquid in the test-tube will assume a rosy tint which will permeate the remainder of the liquid but will always be a little darker near the surface where air is present. The tint of the liquid will gradually darken and finally become scarlet or claret-red. (*Journ. f. prakt. Chem. New Ser.* 24, 44, and *New Remedies*, April, 1882.)

Action of Veratria on the Frog's Heart.—Dr. Sydney Ringer finds that veratria applied to the ventricle alone, induces first such a change in it that each contraction is prolonged, the amplitude of the trace is broader and its summit rounder: next, a single excitation instead of one response induces two contractions, in other words, each excitation produces an increased expenditure of energy. As the effect of veratria progresses (more speedily after a large dose) each excitation produces a prolonged series of contractions lasting thirty or more seconds, and the ventricular action becomes extremely incoördinate. Veratria then increases not only the expenditure of energy set free by each excitation, but it lessens or destroys the factors which make the action of the ventricle coördinate. These effects veratria produces by its direct action on the muscular tissue, since they were obtained with the lower two-thirds of the ventricle, a part free from nervous ganglia. Temperature strikingly influences the action of veratria on the ventricle. A small dose greatly affects the ventricle at a moderate or high temperature, but at a low temperature produces no effect. At a low temperature a large dose whilst greatly increasing the duration of the contraction (increased expenditure of energy) only slightly incoördinates the action. It is probable that the temperature of fever may in this way modify the influence of remedies, or that veratria may affect the heart more powerfully in fever than in health. The incoördinate action is produced mainly if not exclusively by incoördinate dilatation. One portion dilates and forms a pouch, whilst the rest remains contracted. After each excitation there is first a coördinate contraction, but then some portions remain *contracted longer than others*, so that irregular dilatation ensues. Veratria, therefore, affects the heart much as it affects the skeletal muscles. (*Archives of Medicine*, Feb. 1882.)

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⁂ Any of the foreign works may be procured on application to Messrs. DULAU, of Soho Square, W.C.; WILLIAMS and NORGATE, of Henrietta Street, Covent Garden, W.C.; or BAILLIÈRE, of King William Street, Charing Cross.

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Department of Public Health.

YELLOW FEVER.[1]

BY JOSEPH JONES, M.D. NEW ORLEANS.

President of the Louisiana State Board of Health.

(*Continued from* p. 80.)

Stage of Depression and Exhaustion.—In cases which terminate favourably, the deleterious substances generated during the stage of febrile excitement are gradually eliminated, and the organs especially affected by the poison resume their healthy action. In those cases which end fatally at this stage, the issue appears to be mainly determined by heart-failure from acute fatty degeneration, as well as the profound blood-changes induced by the specific poison, and the retention of the secretions of the liver and kidneys, the functions of which are arrested. There appear to be no just grounds for the subdivision of this fourth stage in accordance with the presence or absence of hæmorrhage, coma, jaundice, uræmic poisoning and convulsions, for these are simply effects and aggravations of the preceding symptoms, and must be regarded as the maximum phenomena of the stage. Neither is this stage to be regarded as similar to, or identical with, the intermission or remission of malarial fever, or as an abortive repetition of the febrile stage in which the disease ends from adynamic incompetency to carry out the phenomena.

The Black Vomit.—The ejection of altered blood from the stomach—the black vomit—during the period of depression, although not absolutely characteristic of yellow fever, is still of such frequent occurrence as to demand special consideration both of its nature and origin. The character of the matters vomited varies in different stages of the disease, as also with the degree of severity. Whilst yellow fever is characterised, in common with several other diseased states, by an irritation of the gastric mucous membrane, the peculiar nature of the vomited matters does not rest entirely upon this irritation and congestion, but is influenced to a greater or less extent by the changes in the blood, liver, kidneys, and nervous system. The vomiting also may be regarded as, to a certain extent, salutary, and as an effort for the elimination of excrementitious materials from the blood, for in some cases distinct improvement follows the vomiting, as seen in the abatement of the pyrexia and the cleaner condition of the tongue; and it would almost seem that were it not for the profound changes in the blood and organs lying at the back of this almost universally fatal symptom, recovery might start from its occurrence. The first ejections generally consist of the ordinary gastric secretions, followed by a mucoid fluid, which is frequently at first tinged with bile, sometimes of an acid, sometimes of an alkaline reaction. The acidity is not due to the presence of any peculiar acid, but to hydrochloric or lactic acid, and is mainly determined in intensity by the nature of the ingesta. After the first vomiting the stomach may remain tolerably quiet until the subsidence of the fever on the third, fourth, or fifth day, when, without any premonitory symptoms of nausea, the stomach, on any trifling provocation, may eject a quantity of clear, pale, almost limpid and slightly acid, opalescent fluid. At this period the disease may terminate as if this excretion were similar to the perspiration of intermittent fever. If the vomiting continue, it becomes first streaked with dark flocculi of altered blood, and acquires an alkaline reaction, due to carbonate of ammonia, arising from the decomposition of the urea, which is eliminated from the gastric mucous membrane. The black vomit varies in specific gravity from near that of distilled water to that of blood; and it consists of the secretion of the mucous membrane, mixed with food, altered blood, epithelial cells, and excrementitious products, such as urea and carbonate of ammonia.

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[1] From the *Annual Report of the Board of Health* for 1881.

The Urine.—The reaction of the urine is invariably acid, even in the gravest cases. As a rule the specific gravity ranges from 1009 to 1028. In those specimens of the highest density the increase appeared to be due to the amount of albumen. During the early stages of the disease the urine is normal in colour, clearness, and quantity; as the disease proceeds it becomes of a deep yellow colour from the admixture of bile, and on the fourth or fifth day appears turbid from the presence of renal epithelial cells, tube-casts, and yellow granular albuminoid matter. The colour may deepen to orange-red, or even to reddish-brown; and it sometimes presents an oily appearance. The quantity may be much diminished up to complete suppression. As a general rule the amount is diminished in the active stages of the fever. If the case advance favourably the urine is copious, and the colour progressively increases in depth even to almost black. In grave cases it is much less abundant and at the same time of a much lighter colour. Albumen is an almost invariable constituent, and may appear as early as the first day of the disease, but most generally from the second to the fifth. When convalescence is protracted the albuminuria may continue long after all symptoms but debility have left the patient. When precipitated by heat or nitric acid the albumen appears of a golden yellow or light brownish colour. As much as one ounce of dried albumen has been excreted in twenty-four hours, representing the albumen of nearly one pound of blood. Associated with the albumen are renal epithelial cells and casts of tubules, but the albuminuria must not be wholly referred to an acute desquamation of the excretory cells, nor to mere capillary congestion, but is equally due to chemical changes effected by the poison of yellow fever in the albumen and fibrin of the blood. The albumen appears in large amount in the urine in cases where there is no apparent failure in the excretory action of the kidneys, and in which the urine is abundant, and laden with urea and also bile. The presence in the urine of red corpuscles and the colouring matter of the blood is not so characteristic in this disease as in the so-called malarial hæmaturia, where renal casts and epithelium may occur in considerable amount, but with only sufficient albumen to correspond to the exuded blood; whilst in yellow fever, when blood does appear in the urine, the amount of albumen is much greater than could thereby be accounted for. In the former disease, also, the urinary casts contain red corpuscles and are of a brownish colour in place of the golden yellow tint which these oil-laden bodies present in yellow fever.

Throughout the disease, when there is no suppression, the amount of urea is much increased, reaching as much as a thousand grains *per diem*. There is a similar increase in the phosphoric and sulphuric acids, up to as much as fifty and sixty grains respectively.

PATHOLOGY.—The various manifestations (as the intense capillary congestion, cardiac depression, delirium, coma and convulsions, vomiting, hæmorrhage, urinary suppression and jaundice), may all be referred to the action of the specific poison, and should not be erected into distinct types of disease, however prominent any one of these symptoms may be, and however much cases may differ from one another. The action of the yellow fever poison is the same in all cases, whether mild or severe; the progress and termination, and the manifestation of the various symptoms, depending on the degree of action of the poison, the condition of the system at the time of its introduction, the peculiarities of constitution, the various agencies to which the patient is subjected during the course of the disease, and the supervention of other maladies.

Yellow fever, according to this view, partakes of the nature of a continued pestilential fever, presenting two well-defined stages: the first characterized by active chemical change in the blood and organs, attended with elevation of temperature, which may constitute the entire malady, and prove fatal in a manner similar to other acute specific fevers; the second, or stage of depression, resulting from the action of the poison and the blood changes induced by the suppressed functions of certain organs.

From a consideration of the foregoing symptoms, it is manifest that the blood must have undergone profound changes, which seem to consist chiefly of the following:—

1. Such an alteration of the chemico-physical properties of the fibrin and albumen as leads to the transudation of the latter, through the excretory structures of the kidney.

2. Various degrees of diminution of the fibrin, in some cases amounting to almost entire disappearance; and this apparently due more to the direct action of the specific poison than to the retained urea, bile acids, &c. As a result, the blood coagulates imperfectly, and the clot is soft and bulky, exuding but little serum, and often breaking down on standing into a grumous fluid.

3. Whilst the red blood-corpuscles are not specially diminished, they may be in severe cases altered in appearance.

4. Increase of fatty and extractive matters.

5. Accumulation of the biliary constituents, as shown by the golden-yellow colour of the serum.

6. Accumulation of the urinary constituents, especially the urea, carbonate of ammonia, chloride of sodium, and phosphoric and sulphuric acids. The alkaline reaction of the blood during life rapidly changes after death to acid.

7. Rapid dissolution of the red blood-corpuscles, with corresponding diminution of their oxygen-carrying power after abstraction.

8. Rapid putrefaction, after its abstraction from the body.

The various causes of black vomit may be thus summarized: 1. The irritation and structural alteration of the gastric mucous membrane, which is a part of the general tissue-degradation, consisting of granular and fatty degeneration of the secreting cells and of the walls of the smaller blood-vessels and capillaries, as well as the general congestion of the organ. 2. The changes in the blood, especially the marked diminution of the fibrin. 3. The suppression of the action of the kidneys, and the retention in the blood of urea and similar bodies. It may be noted that black vomit rarely occurs in those cases where the kidneys act continuously and freely. 4. The direct irritation of the urea and its derivatives, which are eliminated vicariously from the gastro-intestinal mucous membrane. 5. The irritant nauseating effects of the bile retained in the blood.

In yellow fever, acute atrophy of the liver, and acute phosphorous-poisoning—diseased states which have many symptoms and pathological lesions in common—it would seem that the oxidation of albuminoids is not so complete as in health, and besides the formation of leucin, tyrosin, and other similar bodies, a large amount of fat is produced, which may extensively infiltrate the tissues. It is clear that one effect of suppression of urine is to determine the retention in the blood of a large excess of urea. This may in part be eliminated by the gastro-intestinal mucous membrane, and the black vomit may be intensely alkaline from carbonate of ammonia derived from this substance; and it is further evident that in many cases of yellow fever the fatal issue is determined chiefly by the retention in the blood of the constituents of the urine. To the same cause also must be attributed, to a great extent, the nervous irritation, delirium, convulsions, and coma which characterize the stage of depression. Certain of the blood-changes may be referred also to the same cause.

DURATION.—The several stages of yellow fever, just described, are not uniform in their duration, and there may be a marked diversity in the manifestation of the symptoms in individual cases, some presenting apparently but the stage of febrile excitement, whilst others, overwhelmed as it were by the poison, at once pass into a condition of hopeless prostration. In mild cases, especially in children, the disease may be so slight as barely to attract attention, and convalescence may be established in two or three days. The stage of febrile excitement may continue from two to six days, rarely beyond three or four, and the patient may pass almost imperceptibly into convalescence during the stage of depression. The severest cases may prove fatal in two or three days, with an axillary temperature of 110° Fahr.; or later from hæmorrhage, urinary suppression, general prostration, or an adynamic state, accompanied with parotid abscess, revival of old complaints, or the supervention of some other disease, such as malarial fever. The fourth stage may be of long duration, extending over weeks and even months. It is, however, true that convalescence is comparatively rapid, and in striking contrast to the tedious recovery from malarial fever. In some cases vomiting may be the prominent symptom, in others hæmorrhage from the stomach and bowels, or from the gums, eyes, and ears; in others, again, the cerebral symptoms may be most marked.

TERMINATIONS AND MORTALITY.—In fatal cases death may be referred to a variety of causes, namely: 1. The direct action of the fever-poison upon the blood and nervous system. 2. The disturbance or suppression of function of certain organs, as the kidneys and liver. 3. Syncope from cardiac degeneration. 4. Profuse hæmorrhages from the stomach and bowels. 5. Blood-poisoning from absorption of putrid black vomit in the stomach. 6. The formation of abscesses and consequent pyæmia.

The mortality occasioned by yellow fever appears to be as great as that caused by any known epidemic or endemic disease, and varies in different localities and epidemics from 10 to 70 per cent. of those attacked.

TREATMENT.—1. *Prophylactic*—Experience has established the possibility of excluding yellow fever from localities in which it has prevailed as an epidemic subsequent to introduction from other regions, by means of an absolutely strict quarantine. But, hitherto, it has been almost impossible to arrive at any definite conclusions as to the value of quarantine in those regions in which the disease is endemic and indigenous.

Much difference of opinion has existed as to the value of disinfectants, such as chlorine, carbolic acid, and sulphurous acid. In arresting the spread of the fever it is very doubtful whether much of the benefit that has been attributed to them is not rather to be ascribed to other causes; and, in estimating the value of any such sanitary measures, the following facts in the history of yellow fever should be considered:

First—Yellow fever may prevail in one or more cities, and at the same time be entirely absent from other cities in the same zone, and subjected to very nearly the same hygienic conditions. The mere absence of yellow fever from a particular city, whilst it is prevailing elsewhere, proves nothing as to the mere sanitary condition and measures of the city enjoying the immunity.

Second—One of the most essential elements for the origin and spread of yellow fever within and immediately around its recognised geographical limits is the influx of strangers and immigrants, or an unacclimatized population.

Third—It is not probable that a widespread epidemic would ever arise in a city within the recognised zone in which the vast proportion of the inhabitants are acclimatized and have been subjected to the action of the specific poison.

Fourth—Yellow fever has been entirely absent from many cities, where serious epidemics have occurred, during long series of years; and at other times has prevailed to a very limited extent, and with but slight mortality, when no disinfectants had been used.

2. *Curative.*—Yellow fever is a "self-limited" disease, and cannot be arrested by drugs. Every case should be regarded as serious, however slight the symptoms may appear; and, on account of the structural alterations in the blood and organs, the closest medical attendance and most careful nursing are required. Since so many of the symptoms are due to arrest of the functions of the skin and kidneys, efforts should be directed to promote the activity of these organs during the progress of the disease. Stimulant diuretics should, as a rule, be avoided; but benefit often follows the free use of hot mustard foot-baths, vapour baths, and sometimes warm baths. Diaphoresis and diuresis may be further promoted by large draughts of lemonade, decoctions of orange leaf and sage tea, and water charged with carbolic acid. Absolute rest in the recumbent posture must be maintained as far as possible. The necessity for this is especially indicated by the cardiac weakness, fatal results having followed rising from bed and walking during the period of calm.

The maintenance of free ventilation, and the avoidance at the same time of sudden changes of temperature by proper coverings, is essential. Experience shows that many fatal cases from urinary suppression have followed sudden changes and falls of temperature. Each case of yellow fever should have at least 2000 cubic feet of space; and hospitals, where practicable, should be constructed on elevated situations. All discharges should be immediately removed from the sick-room, the bedding frequently changed, and the soiled clothing boiled, or baked at a temperature of not less that 230° Fahr.

The practice of covering patients with heavy blankets, and at the same time giving large quantities of hot drinks, with the object of inducing profuse sweating, frequently appears to be injurious, not only from the debilitating effect, but also from the greater susceptibility of the skin, and the increased tendency to renal congestion thereby induced.

The diet should be light and nutritious. Beef tea, chicken tea, corn and rice gruel, barley water, iced milk, and milk and lime-water, are the best forms of nourishment, and should be continued at regular intervals throughout the active stages of the disease. Solid food, and even bread, should be avoided.

In many cases the preceding measures, accompanied by absolute rest in bed and the careful and continuous attention of an experienced nurse, will be all that is required.

Alcoholic stimulants should be used with caution. They have proved beneficial in cases attended with great prostration, champagne appearing to be the best form.

Continuous observations of the temperature should be made, as by that means prognosis and treatment may best be regulated. If the axilla temperature rise in the first stage above 105°, the patient is in imminent danger; and if it reach from 109° to 110°, death is almost inevitable. Cases, however, have recovered in which the temperature has reached the latter point. When the temperature rapidly rises to 106° and upwards, death sometimes occurs suddenly, and apparently solely from the effects of the high temperature upon the blood, heart, and nervous system, as in sunstroke. The treatment for this hyperpyrexia consists in the giving of such cardiac sedatives as aconite, veratrum viride, or gelsemium; the injection of large quantities of ice-cold water into the rectum, sponging the surface with cold water, or with water, acetic acid, and alcohol; and blood-letting. It appears, also, that an active purgative, such as calomel or castor-oil, followed immediately by one or two full doses of quinine in the first twenty-four hours of the fever, may reduce the temperature.

Efficient but gentle purgation in the early part of the first stage may be beneficial. Mercurials should not be given later than the second day, for an adult—eight to twelve grains of calomel, or blue pill, or an ordinary dose of castor-oil, will be sufficient. Purgatives, as a general rule, should not be administered in the stage of depression. An emetic may be useful at the very beginning, if the stomach be loaded. Local blood-letting, whilst of occasional benefit for the relief of congestion in the first stage, is most injurious later. Dry-cuppings and sinapisms are usually sufficiently effective.

The internal administration of the mineral acids or the tincture of the sesqui-chloride of iron, from their supposed beneficial effects upon the jaundice and black vomit respectively, is of doubtful propriety, and sometimes directly injurious.

The value of quinine in this disease is not nearly so great as in paroxysmal malarial fever; and notwithstanding statements to the contrary, the writer fails to discover any facts or cases by which the power of large doses of quinine to abort yellow fever can be fully and unequivocally established, though its efficacy, not only in arresting, but in warding off paroxysmal fever, is undoubted. It is rather as an antidote to the effects of the poison, than to the poison itself, that quinine is of use.

Opium, in whatever form, should be administered with great caution, from its poisonous effects when the kidney-action is arrested, but may be of advantage when sleeplessness and restlessness are prominent. Arrest of the functions of the kidneys, owing to the grave alterations in their structures, is beyond relief by drugs. The tincture of ergot, which has been recommended, has often failed; but much good has been accomplished, and the function of the kidneys restored, by the injection at regular intervals of a pint or more of ice-cold water into the rectum.

When there is a threatening of black vomit ice should be swallowed, and bags of the same applied to the epigastrium. Septic poisoning has been known to follow decomposition of the blood effused into the gastro-intestinal tract, and to prevent this, scruple doses of sulpho-carbolate of soda, repeated every three or four hours, have been given with advantage.

During the period of calm, active medication, beyond what has been indicated, should be abstained from. The diet should still be of the simplest and most nutritious and most digestible character. In this stage there is often a morbid craving for food, and in some instances relapse and death have been the result of the unrestrained indulgence of the appetite.

The following is a brief outline of the plan of treatment based upon the preceding principles, which I carried out during the epidemic yellow fever of 1878, in New Orleans, Louisiana:

In severity this epidemic ranks the third in the history of New Orleans, being surpassed in mortality by the great epidemics of 1853 and 1858. In 1878, the deaths caused by yellow fever in New Orleans, numbered 4,056, out of a total of 10,318 deaths from all causes, in a population of about 210,000.

It has been estimated upon the returns of the sanitary census of the city, executed by the Board of Health, shortly after the close of the epidemic, that not less than 25,000 of the citizens of New Orleans suffered from yellow fever during the months of July, August, September, October, November, and December, 1878.

The total number of cases treated in my practice was 256 (this number would have been far greater, as I suffered from a severe attack of fever in August and another of the gravest character, which reduced me to extremis in the early part of October, and continued through November and December); total deaths, 18; one death in 14·2 cases; mortality, 7·0 per cent. Of the 256 cases, 238 recovered, giving a per cent. of 93·35 recoveries.

1. If there was any reason to suppose that the stomach contained undigested food, it was immediately evacuated by an emetic. Powdered ipecacuanha root, mixed with warm water, was most generally employed.

2. The bowels were freely evacuated as early as possible. To accomplish this end, and also at the same time to induce an impression upon the system by quinine, from 10 to 20 grains each of quinine and calomel were administered to adults, and followed with a full dose of castor-oil (oleum ricini), in doses of from half an ounce to one ounce for an adult. These remedies were proportioned to the ages of the patients, and as a general rule, 10 grains of calomel and 10 grains of quinine were found to be sufficient for the adult. These measures for unloading the bowels and improving the nervous system were instituted at the earliest practicable moment after the onset of the disease. The free evacuation of the bowels in the early stage of the fever appeared to moderate the febrile heat, to diminish the congestion of the intestinal organs, and to diminish the frequency of the occurrence of black vomit.

3. The action of the skin was excited by the use of the hot mustard foot-bath, and mild diuretics, as orange-leaf tea, and by frictions of fresh olive-oil.

4. The function of the kidneys was maintained by the regular use of cold water and Apollinaris water; by attention to the covering of the patient and avoidance of cold currents of air.

The cold-water bath was discarded because it tended to induce fatal congestion of the kidneys, and necessitated such movements on the part of the patient as were incompatible with the enfeebled action of the heart.

5. Absolute rest, in a well-ventilated room, with absence of noise and excitement, and with careful nursing night and day.

6. The patients were confined to barley-water during the period of febrile excitement.

7. The patients were not allowed to rise from the bed upon any pretext whatever. The medicines and drinks and nourishment were administered by means of the sick cup. Whether the case was mild or severe, the patient was required to remain quietly in bed from eight to fourteen days, and even longer in severe cases.

8. In many cases, especially in adult natives of New Orleans, these measures rigidly enforced were sufficient.

9. When the initial temperature was high and the pulse rapid, such antipyretic and antizymotic remedies were used as tincture of veratrum viride, 2 to 4 drops in orange-leaf tea, every two or four hours, or the tincture of gelsemium (yellow jasmine) 5 to 10 drops every two or four hours; frictions with quinine liniment, composed of from one to two drachms of the sulphate of quinia, mixed with three fluid ounces each of soap liniment (linimenti saponis) and olive-oil; sulpho-carbolate of sodium, 10 grains in orange-leaf tea every four hours.

10. Cold applications to the head, sedative water, vinegar and water, whisky and water, and cloths saturated in cold water, were freely used when there was heat about the head and nervous irritability.

11. Gastric irritation was treated by sinapisms to the epigastrium, cold applications, and in some cases wet cups, and carbonate of lime (precipitated) with small quantities of kreosote.

12. As a general rule the use of opiates and chloral was discarded. In some cases, however, attended with great nervous excitement, and unattended by urinary suppression, these agents were employed, and apparently with benefit.

13. When the kidneys were involved seriously, and the urine diminished in amount, wet cups were applied to the loins,

followed by flax-seed poultices. Bromide of potassium in such cases appeared to increase the flow of urine, and at the same time to quiet the nervous system.

14. After the subsidence of the febrile excitement iced champagne and beef tea were administered in small quantities at regular intervals.

In cases which assumed a *typhoid* state attended with tympanitic bowels, ice-cold enemas, containing small quantities of tincture of assafœtida and oil of turpentine were found to be beneficial. It was also found that in some cases large enemata of ice-cold water not merely reduced the febrile heat, stimulated the bowels to expel the gaseous accumulations, but also promoted the action of the kidneys.

15. When secondary fever ensued, and presented an intermittent or remittent type, the sulphate and bromide of quinia were freely used, and when the stomach would tolerate nourishment and stimulants, beef tea, chicken tea, and tender beef steak, and good port wine, brandy or whisky, were administered.

16. When carbuncles and abscesses supervened, prolonging convalescence and endangering the life of the patient, the tincture of iron, quinine, the mineral acids, and bitter tonics, with alcoholic stimulants, were freely used, together with nutritious diet, and the local application of carbolic acid, tincture of iodine, tannic acid and tincture of opium.

17. Relapses were avoided by confining the patient to bed until the heart had regained its usual vigour, and by strict attention to diet of a simple but nutritious kind.

18. Each case was carefully studied; accurate records of the temperature and pulse, and of the symptoms and treatment, were preserved, and the treatment directed accordingly. It was my experience that the careful recording of the symptoms—once, twice, and even three times daily—not merely aided the physician in the most effective manner, but also established a quiet and most valuable confidence on the part of the patient and his attendants.

THE PRACTITIONER.

SEPTEMBER, 1882.

Original Communications.

ON A CASE OF ACUTE ATROPHIC SPINAL PARALYSIS OF ADULTS, AND ONE OF HÆMATOMYELIA ILLUSTRATING THE LOCALISATION OF THE LESION IN THE CERVICAL ENLARGEMENT OF THE CORD IN CASES OF ATROPHIC SPINAL PARALYSIS.

BY JAMES ROSS, M.D., F.R.C.P. LOND.

Assistant-Physician to the Manchester Royal Infirmary.

(*Continued from* p. 120.)

THIS case is an undoubted example of the acute atrophic spinal paralysis of adults. The patient was 22 years of age at the onset of the affection, and therefore an *adult ;* the paralysis became established, in great part at least, in the course of a single night, and consequently the affection was *acute ;* the electrical reactions showed that the paralysis was of the *atrophic variety ;* and the absence of sensory disturbances taken along with the fact that the grouping of the affected muscles did not correspond to the distribution of any particular nerve or nerves shows that the disease was of *spinal origin.* The disease must therefore have been situated in the left anterior grey horn of the cervical enlargement of the spinal cord, and in proceeding to determine still more accurately its limits I shall make two assumptions ; first, that the intensity of the disease in the parts of the cord innervating the affected muscles was in direct proportion to the time occupied by the various muscles in recovering from the paralysis; and second, that there was only one lesion.

The paralysed muscles may be divided into three groups according to the time occupied in their recovery. The first group consisted of the external rotators of the humerus, which recovered at the end of three months; the second of the deltoid biceps, brachialis anticus, and supinator longus which recovered at the end of six months, and the third of the extensors of the wrist, thumb, and fingers, which only recovered at the end of ten months from the commencement. If my first assumption be true, the spinal centre of the first group was affected by disease of slight intensity, that of the second by disease of medium intensity, and that of the third group by disease of high intensity; and if my second assumption be true, the spinal centres of the first, second, and third groups of paralysed muscles were continuous with one another. And a close consideration of the mode of onset of the paralysis appears to confirm this conclusion. The patient stated positively, that although the fore-arm was paralysed on the morning after the night on which she experienced the pain for the first time, yet she could bend her arm at the elbow for some days subsequently, and the paralysis of the upper arm was not complete until the end of the first week of the disease. It would appear, therefore, from the history of the onset of the paralysis alone, that the disease became first established and progressed more rapidly in the spinal centre of the third group than in the spinal centres of the other groups. The lesion was in all probability of an inflammatory nature. It is very unlikely that so complete a recovery as occurred in this case would take place from the destruction of tissue which even a slight hæmorrhage would have occasioned. It may, therefore, be inferred that the disease began in the spinal centre of the extensors, and invaded more or less gradually the spinal centres of the remaining groups of paralysed muscles. And it may be presumed that during recovery the reverse of this process had occurred. Resolution began in the spinal centres of the first and second groups of paralysed muscles, and gradually encroached upon the spinal centre of the third group or of the extensors.

Let us now endeavour to fix the limits of the lesion more accurately. It was pointed out by Erb, that if the electrode of a faradic current be placed on a level with the transverse process of the sixth cervical vertebra the deltoid, biceps, brachialis anticus, and the long and short supinator muscles enter into contraction.[1] He also showed that combined paralysis of these muscles is not unfrequently observed as a result of a lesion of the peripheral nerves. Of four cases of this kind described by Erb, one was caused by tumour of the scapula, another by neuritis, and the two remaining were of traumatic origin. In all of these cases the muscles were notably atrophied and presented the reaction of degeneration. Similar cases have been described by E. Remak,[2] Hoedemaker,[3] Lannois,[4] and Bernhardt.[5] Slight sensory disturbances may be present at the first, but these usually disappear. Nearly the same muscles are affected in the form of paralysis which Duchenne has described in newly-born children under the name of "paralysie obstétricale infantile du membre supérieur."[6] The paralysis always occurs in children whose birth had been affected by some operative procedure, and doubtless results from mechanical compression caused during delivery. Cases of this kind have likewise been described by Seeligmüller.[7] In the paralysis of infants, however, the infra-spinatus muscle is found paralysed, while this muscle escapes in the cases described by Erb and others as occurring in adults. The lesion must, as Erb remarks, have been situated at a point where the fibres forming the circumflex, musculo-cutaneous, and a part of the musculo-spiral nerves lie in close proximity. Hoedemaker maintains that the lesion is situated in the cord formed by the fifth and sixth cervical nerves, as it lies between the scalenus medius and posticus muscles. But as Bernhardt remarks, it would be difficult to understand on this supposition how the suprascapular nerves supplying the supra- and infra-spinatus muscles, and the external anterior thoracic nerve supplying the pectoralis major could escape. It is, therefore, more probable that the lesion is situated, as Bernhardt maintains, in the fifth root before its junction with the sixth or the communicating branch of the fourth root.

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[1] *Verhandlungen des naturhistorischen Vereins zu Heidelberg*, 1875, s. 130. See also Ziemssen's *Cyclopædia of the Practice of Medicine*, vol. xi. p. 561.

[2] "Zur Pathologie der Lähmungen des Plexus brachialis," *Berlin. klin. Wochenschrift*, 1877, No. 9.

[3] "Ueber die von Erb zuerst beschriebene combinirte Lähmungsform, an der oberen Extremität," von Dr. H. ten Cate Hoedemaker, *Archiv für Psychiatrie*, Bd. ix. s. 738.

[4] "Contribution a l'étude du paralysies spontanées du plexus brachial," par le Dr. Lannois *Revue de Médecine*, tome i. 1881, p. 996.

[5] "Beiträge zur Lehre von den Lähmungen im Bereiche des Plexus brachialis," von Dr. Martin Bernhardt, *Zeitschrift. f. klinische Medicin*, Bd. iv. H. 3.

[6] *Electrisation Localisée*, 1872, p. 357.

[7] "Ueber Lahmungen, welche Kinder inter partum acquiriren," *Berlin. klin. Wochenschrift*, 1874, Nos. 40 and 41.

It has been pointed out by E. Remak[1] that in disease of the anterior cornua of the spinal cord the muscles are paralysed in groups in accordance with their association in action, and from this he infers that the ganglion cells which innervate each muscular group must lie near to each other.

In what he calls the "upper-arm type" of paralysis the supinator longus is paralysed along with the brachialis anticus, biceps, and deltoid, these being the muscles implicated in the cases of peripheral paralysis described by Erb and others. Cases of this kind have also been reported by Dr. Ferrier.[2] In a case of infantile paralysis reported by Schultze,[3] in addition to extensive paralysis of the lower extremities there was paralysis of the "upper-arm type" of the right upper extremity. Schultze found that in the upper segment of the cervical enlargement, which would correspond to the fifth nerve, the anterior horn on the right side was atrophied and much smaller than the corresponding one on the left. If, therefore, we assume that the multipolar cells of the fifth nerve regulate the movements of the deltoid, biceps, brachialis anticus, and supinator longus, and if the lesion in this case was a continuous one, it may be inferred that the ganglion cells which regulate the actions of the external rotators of the humerus lie immediately above these, and that consequently the supra- and infra-spinatus and teres-minor muscles are innervated from the lower fibres of the fourth nerve. It may also be inferred that the extensors of the wrist, thumb, and fingers are innervated from the sixth, but how far the lesion may extend downwards it is impossible to say. These conclusions are strengthened by reference to the mode of onset of the disease and the order in which the muscles recovered. We have already seen that, according to the statement of the patient, paralysis of the extensors was fully established when she awoke on the morning after the night on which she first experienced the pain, but that paralysis of the muscles of the upper arm was not fully established until several days had elapsed. From this it may be inferred that the lesion had extended from below upwards, and it is most likely that resolution would occur from above downwards. If that be the case, it may be concluded from the order in which recovery took place that the spinal centre of the external rotators of the humerus occupied the highest position in the lesion ; that the centre of the posterior third or scapular portion of the deltoid lay next to that of the rotators and above the centre for the anterior two-thirds or clavicular portion of the deltoid ; that the spinal centres of the clavicular portion of the deltoid, the biceps, brachialis anticus, and supinator longus lay near together; and that the centre of the extensors occupied the lowest position in the lesion. These inferences do not in any way conflict with the statements of Krause with regard to the origin of the various nerves of the brachial plexus, or with the conclusions of Professors Ferrier and Yeo from their experiments on monkeys. They are also in considerable measure confirmatory of Dr. Ferrier's conclusions from clinical observation.

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[1] *Archiv f. Psychiatrie*, 1876 and 1879.

[2] "The Localisation of Atrophic Paralyses," by David Ferrier, M.D., F.R.S., *Brain*, 1882, vol. iv. p. 227.

[3] *Virchow's Archiv.* Bd. lxxii. 1878, s. 443.

In a case of limited poliomyelitis observed by him, the rhomboids, the outward rotators of the humerus, the deltoid, the flexors of the fore-arm, and the supinator longus, were paralysed and atrophied. The scapular and acromial division of the deltoid manifested the reaction of degeneration, but in the clavicular portion of the deltoid and in all the remaining muscles the electrical excitability was only diminished. Dr. Ferrier thinks that this case corresponds to the fourth cervical type, and that the lesion was situated on a level with the fourth nerve. I should prefer, however, to say that the main lesion was situated on a level with the point of junction of the fourth and fifth nerves, and that there were ascending and descending extensions of it up to the level of the upper end of the fourth, and down to the level of the lower end of the fifth root. And, I believe that if this case were watched, recovery of all the muscles would be found to have taken place by the end of three or six months, with the exception of the outer two-thirds of the deltoid, which would either not recover until the end of nine or twelve months, or would have remained permanently paralysed and atrophied. In Dr. Ferrier's second observation the right arm of a man aged sixty-five years became suddenly paralysed, and the absence of disturbances of sensibility showed that the case was one of poliomyelitis anterior. The rhomboid, serratus magnus, infra-spinatus, deltoid, biceps, brachialis anticus, supinator longus, and extensors of fingers and wrist, were paralysed, but the clavicular and acromial portions of the deltoid alone manifested the reaction of degeneration. Dr. Ferrier regards this case as an example of disease on a level with the upper part of the fourth and fifth cervical roots. I should say that the main lesion was situated in this case on a level with the upper part of the fifth root, and that there were upward and downward extensions of the lesion, the latter coming as far as to the level of the lower end of the sixth root. Recovery would of course take place in this case in reverse order to the invasion, and all the muscles would recover in a brief space of time with the exception of the anterior two-thirds of the deltoid. In Dr. Ferrier's third and fourth observations the paralysis existed for several months. In both cases the rhomboid, serratus magnus, pectoralis major, latissimus dorsi, deltoid, biceps, brachialis anticus, supinator longus, and extensors of wrist and fingers were implicated. He regards this case as a combined paralysis of the muscles supplied by the fourth, fifth, and sixth cervical nerves, and I quite concur in this conclusion.

But it may be asked if the anterior cornu was diseased on a level with the fifth, sixth, and, probably to some extent of the seventh nerves, in my observation, how it is that the triceps escaped paralysis? Two explanations suggest themselves. The experiments of Ferrier and Yeo show that the triceps is innervated from the seventh and eighth nerves as well as from the sixth, and consequently disease on a level with the sixth and a portion of the seventh would leave the remaining portion of the seventh and the eighth nerves unaffected. But if a portion even of the spinal centre of the muscle was injured, surely this would manifest itself by a certain degree of feebleness, but in this case no relative diminution of power could be detected in the muscle, and I incline to the belief that the spinal centre of the triceps had entirely escaped. The annexed drawing was taken by Mr. A. H. Young from a section of the lumbar enlargement of the spinal cord from a case of infantile paralysis in which the muscles of the lower extremity were extensively implicated. I am indebted to the kindness of Dr. Humphreys, under whose care the patient was, for the section from which the drawing was taken. An inspection of this drawing shows that the antero-lateral group of cells was uninjured, and that their connections with the muscles were not interrupted. The condition which was present in Dr. Humphreys' case renders it probable that the lesion in my case did not occupy the whole of the

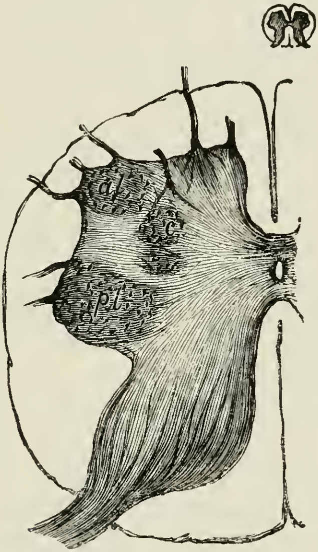

FIG. 1.

transverse area of the anterior cornu, even on a level with the sixth nerve. The escape of the pectoralis major, which is supplied by the external anterior thoracic nerve, may probably also be explained in this way. But I shall now proceed to describe my second observation.

The notes of the following case were taken by Mr. John Fletcher, my clinical clerk :—

CASE II.—Samuel B., æt. 19 years, was admitted to the Manchester Royal Infirmary, under the care of Dr. Ross, on September 24, 1880. The patient states that he had never suffered from any illness until the morning of the day on which he was admitted. On that morning he went as usual to his work, that of a turner, but he was soon seized with a severe pain between the shoulders; he found he could not use the hammer which he held in his right hand, and in a few minutes afterwards he lost power in his left hand. He felt faint and sat down for a short time, but he soon got up and walked across the apartment where he worked, with the view of getting down stairs and going home. When on the stairs his right leg gave way and he fell, and soon afterwards he found that the left leg was likewise paralysed. He was carried home, and in the afternoon of the same day was conveyed to the Royal Infirmary. He states that the time which elapsed from the commencement of the attack, until he found himself paralysed in both hands and both lower extremities, was under a quarter of an hour.

Present Condition.—The following report was taken on Oct. 3rd, ten days after the patient's admission to the Infirmary:

The patient is a well-developed young man, with sandy hair and fair complexion, and of healthy appearance. Both lower extremities are completely paralysed. The flexors of the wrist, flexors of the fingers, and intrinsic muscles of the hand are paralysed on both sides. When the patient is asked to grasp a hand placed in his, the extensors are called into action while the flexors remain unmoved, and consequently the hand assumes a very peculiar position. The hand during the voluntary effort becomes hyper-extended upon the fore-arm, the first phalangeal bones become extended upon the metacarpal bones, while the second phalangeal bones are flexed upon the first, and the third upon the second. The second and third phalanges do not offer the slightest resistance to extension by passive movements, although the patient cannot extend them by voluntary effort. The thumb is extended and abducted, and its metacarpal bone is drawn backwards so as to be nearly on the same plane as the metacarpal bones of the fingers. The position of the hand during voluntary efforts at closure corresponds with the position figured by Prof. Charcot as occurring in pachymeningitis cervicalis hypertrophica, when the lesion is situated opposite the seventh cervical and first dorsal vertebræ (Fig. 2). The patient is unable to flex either hand at the wrist, to flex the fingers, to extend them at the phalangeal joints, or to separate them from, or approximate them to, the middle finger. He is unable to oppose, abduct, or flex the thumb, and cannot flex or abduct the little finger. Pronation and supination of the hand, and extension of the wrist and of the fingers at the metacarpo-phalangeal joints, are perfectly performed. All the intercostal muscles on both sides are paralysed, so that the breathing is wholly diaphragmatic. The abdominal muscles contract readily by a voluntary effort, but the patient cannot hold his body erect, apparently from paralysis of the erector-spinæ muscles, no contraction of these muscles being discovered, on the hand being placed over them, during the efforts of the patient to maintain a sitting posture.

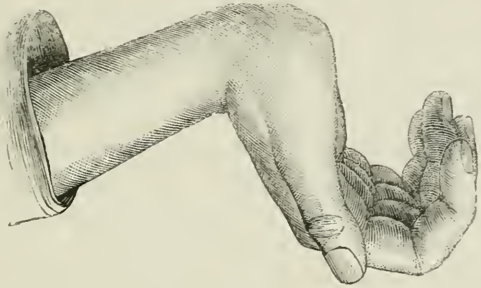

Fig. 2.

There is partial anæsthesia of the skin of the left extremity, and of the left half of the body up to the level of the upper border of the second rib, and some degree of hyperæsthesia of the skin of the right lower extremity, and of the right half of the body up to the level of the tenth rib, and a zone of anæsthesia above this level extending round one-half of the body and upwards, as high as the upper border of the second rib.

The tactile sensibility is nearly normal even over the left extremity, but the thermal sensibility is abolished, while pricking with a pin or pinching gives rise to little or no pain. The thermal sensibility is diminished over the right lower extremity, the tactile sensibility is normal, but the slightest pinch, or prick of a pin is exquisitely painful. Every form of sensibility is almost entirely abolished on both sides of the body between the tenth and second ribs. A narrow strip of skin on the inner border of the arm, and fore-arm, and hand, including two and a-half fingers on the dorsal and palmer aspects, is anæsthetic; the loss of feeling being more pronounced on the right than on the left side. On drawing the cathode of the galvanic battery with thirty cells Leclanché along the spinal column, the anode being placed on the nucha, a spot over the seventh cervical vertebra is found extremely sensitive, and another sensitive spot is met with over the tenth dorsal vertebra, these points being also sensitive to a hot sponge passed over the vertebral column.

There was retention of urine for the first week, and the catheter had consequently to be passed. The penis was in a semi-erect condition for the first few days, but the patient did not appear to be conscious of this. The reflex of the sole, the cremasteric, gluteal, abdominal, and epigastric reflexes are active, but the scapular reflex is abolished. The patellar reflex is active, but not exaggerated; there is no muscular tension, and no ankle clonus. The temperature was normal on his admission, but on the evening of September 26th it rose and fluctuated for a few days between 102°·5 F. in the evening, to 99° F. in the forenoon, and it is now nearly normal again. The electrical reactions of the paralysed muscles of the lower extremities are normal. The faradic contractility of the flexors of the fingers and of the small muscles of the hand is diminished especially on the right side.

December 30th.—Since the patient's admission into the hospital the symptoms have greatly changed, considerable improvement having on the whole taken place. He can now perform all the movements of the left lower extremity with some degree of force, but the right is still completely paralysed. Muscular tension, great exaggeration of the patellar tendon reflex, and ankle clonus, became established in the right lower extremity about five weeks after admission, and now the various segments of the extremity are extended upon one another, and the foot is fixed in a position of talipes equino-varus. There is also a slight exaggeration of the patellar tendon reflex on the left side, and ankle clonus can be elicited, but there is no appreciable increase of muscular tension. Contraction of the anterior group of muscles of the leg can be provoked on both sides, but especially on the right, by producing dorsal flexion of the foot, this being the condition named by Westphal "paradoxical contraction."

The flexors of the wrist, and flexors of the fingers on the left side, as well as the left intercostal muscles, have made a partial recovery, but the corresponding muscles on the right side remain practically unchanged, except that there are now distinct traces of atrophy of the latter muscles, especially in those of the thenar and hypothenar eminences. The erector-spinæ muscles have also recovered their power to a considerable extent. The muscles to the left of the vertebral column, however, could be felt to contract during voluntary efforts at maintaining a sitting posture, many weeks before those on the right side, and even now the muscles of the left contract much more powerfully than those of the right side. With regard to the sensory disorders, the chief alterations which have taken place consist in the gradual disappearance of the hyperæsthesia of the right lower extremity, and the improvement of the anæsthesia of the portion of skin previously implicated in the left upper extremity.

There was some dribbling of urine for a few weeks, and the urine was alkaline for a short time, and contained bacteria and some pus-cells; the cystic troubles have now entirely disappeared, and the urine is normal. The bowels are somewhat constipated, but they do not give any inordinate trouble in this respect. Four weeks from the commencement of the attack a small bed-sore formed over the trochanter of the left femur, and the skin over the sacrum was very red and inflamed although it did not ulcerate; these bed-sores soon healed and did not give much trouble.

It was observed on admission that the right pupil was smaller than the left, and that there was also a diminution of the palpebral fissure of the right, as compared with that of the left eye. The vertical diameters of the right and left palpebral fissures are now in the proportion of two to three; the upper lid of the right side droops as if the patient were suffering from a slight degree of ptosis, but the patient can elevate the upper lid against a resisting finger as powerfully on the right as on the left side, showing that there is no paralysis of the right levator palpebræ. The inequality of the pupils is best seen when the patient looks away from the light. The left pupil then becomes dilated to nearly double the size of the right, but the latter still reacts to light and accommodation. The patient was now sent to the Cheadle Convalescent Hospital, where he remained for several months, and subsequently became an out-patient at the Infirmary.

May 8th, 1882.—Samuel B. presented himself to-day for examination. He is somewhat thin, but healthy looking. The right leg is almost completely paralysed. He can draw back the lower extremity as a whole, and during this movement the different segments of the extremity are extended upon one another, the heel being much elevated, so that the foot is placed in a position of extreme talipes equino-varus. This movement is effected by contraction of the posterior muscles of the thigh, and of the muscles of the calf, and although he is able to draw the foot backwards to a plane behind the body, yet he cannot flex the foot upon the leg, the leg upon the thigh, or the thigh upon the body, when he is in the erect posture, but he can perform the latter movement to a slight extent when he leans his body backwards and to the opposite side, apparently by the action of the psoas and iliacus. The recti and the other abdominal muscles contract readily on both sides, and the erector-spinæ also act powerfully and equally on both sides. The right half of the chest is seen to be flatter than the left half anteriorly, especially from the second to the ninth rib. After expiration the left half of the chest measures 14½ inches on a level with the nipples, and the right half 14¼ on the same level. During a deep inspiration the left half expands to 15¾ inches, while the right only expands to 14½ inches. The intercostal muscles on the right side, beween the second and eighth ribs, appear to be completely paralysed. The first intercostal muscles contract to some extent during inspiration, and the intercostal muscles below the eighth rib appear also to act. The left upper extremity has now almost completely recovered motor power, all the movements of the hand being performed with great facility and force, excepting opposition of the thumb, which is still imperfect. The opponens pollicis is still somewhat wasted on the left side, and the abductor indicis is also slightly atrophied, although its function is feebly performed.

The muscles of the thenar and hypothenar eminences of the right hand are completely atrophied. The metacarpal bone of the thumb is on a level with the corresponding bones of the fingers, as in the hand of the monkey; the fingers are hyperextended at the metacarpo-phalangeal joints and flexed at the phalangeal joints. The thumb is extended and abducted. When the hand is placed flat upon a table, the patient has very little power of separating and approximating the fingers to one another. He can, however, flex the fingers, but his grasp is feeble. He can extend the thumb at all the joints, and can also flex it strongly at the metacarpo-phalangeal, but not at the phalangeal joint; feeble adduction of the thumb is also possible.

He can flex the right with nearly as much force at the wrist as the left hand, but the ulnar flexor acts more powerfully than the radial flexors. The right fore-arm an inch below the internal condyle measures 9 inches, and the left fore-arm 9½ inches. The electrical reactions of the muscles of the lower extremity are normal. The reactions of the muscles of the thenar and hypothenar eminences, and of the abductor indicis of the right hand, are abolished to both currents. A strong faradic current induces a feeble contraction of the flexor brevis pollicis. No reactions have been obtained from the superficial and deep flexors of the fingers; but the flexors of the wrist contract to a medium faradic, and to a medium galvanic current, the contraction to anodal closure being stronger than that to cathodal closure. The electrical reactions of the muscles of the left hand are almost normal, with the exception of the opponens pollicis and the abductor indicis, in which no reactions to either current have been obtained. The reflex of the sole is increased on the right side, and the cremasteric, gluteal, and abdominal reflexes are active, but the epigastric reflex cannot be readily elicited. The patellar tendon reflex is much exaggerated in the right leg; the muscles are tense, resist strongly passive movements of the limb, and ankle clonus is easily provoked. The reflexes of the left lower extremity are normal.

On the right half of the body a band of anæsthesia passes round the body, implicating the cutaneous surface between the level of the lower margin of the second rib, and the lower margin of the eighth rib. The inner border of the right arm from the axilla downwards is anæsthetic. The anæsthesia includes the skin of the axilla, and corresponds to the area of distribution of a portion of the intercosto-humeral, the nerve of Wrisberg, the internal cutaneous, and the terminal branches of the ulnar nerve, two and a-half fingers being implicated on both the palmer and dorsal aspects of the hand.

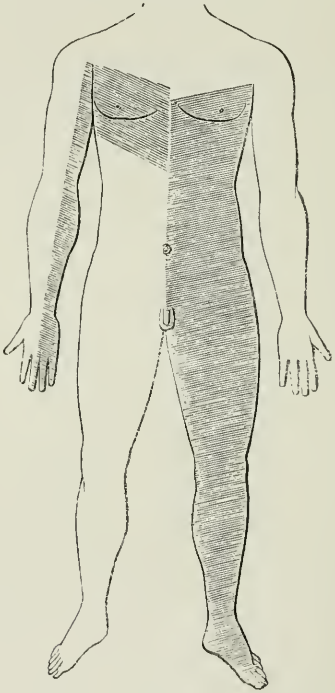

Fig. 3.

The left upper extremity has completely recovered, the cutaneous sensibility being quite normal. On the left half of the trunk, anæsthesia begins on a level with the second rib and extends downwards over the whole half of the trunk and left lower extremity. The anæsthesia is not complete. There is no retardation of sensibility, although great tolerance is exhibited to the prick of a pin in the left lower extremity. Two points are felt as separate when they are removed seven inches from one another, and the patient cannot localise well anything touching his leg. The sense of temperature is almost completely abolished over the left extremity, and indeed over the whole of the anæsthetic areas.

The condition of the palpebral fissure and the pupil of the right eye remains unaltered. During the patient's residence at the convalescent hospital at Cheadle, Dr. Grant, the medical superintendent, made some observations for me with regard to the temperature of the two sides of the face. The temperature was taken in the external auditory meatus, the thermometer being retained fifteen minutes in position. It was found that the temperature in the right meatus was nearly ·2° F. higher than that of the left.

Remarks.—The case just described requires no lengthened comment. I shall pass over the interest which attaches to it as an example of hæmorrhage into the cord, as well as the oculo-pupillary symptoms, and the distribution of the anæsthesia, and shall limit my remarks to the distribution of the paralysis of the right upper extremity. The paralysis of the intercostal muscles, as well as the distribution of the anæsthesia, shows that the greatest extent of the lesion was situated in the dorsal region of the spinal cord. The paralysis of the right lower extremity was clearly caused by injury of the lateral column on the same side as the lesion, and on a level with the dorsal region. I will again assume that there is only one lesion in this case, and if that be so, the injury on the level of the brachial plexus must be continuous with that of the dorsal region, and consequently the cord must be injured on a level with the first dorsal and eighth cervical nerves, although it is not possible to fix accurately its upper limit. The oculo-pupillary symptoms present, show that the cilio-spinal region of the cord was injured, this centre being, according to Bernard, situated on a level with the first and second dorsal nerves.

It may be concluded from this case, that the spinal centres of the pronators of the fore-arm, which were not implicated from the first, lie at a higher elevation in the cervical enlargement than the centre of the flexors of the wrist; that the centre of the radial flexors lie slightly higher, but close to that of the ulnar flexor; that the centres of the flexors of the wrist lie at a higher elevation than that of the long flexors of the fingers, and that the centres of the long flexors lie at a higher elevation than those of the intrinsic muscles of the hand. The fact that the opponens pollicis and abductor indicis of the left hand remain paralysed while all the other muscles of the hand have recovered favours the idea that these muscles are innervated from the lowest ganglion cells which are connected with the brachial plexus.

The fact that the flexors of the wrist, the long flexors of the fingers, and the intrinsic muscles of the hand, are innervated from the eighth cervical and first dorsal nerves, has already been proved by clinical observation. In a case of hypertrophic cervical pachymeningitis, reported by Charcot and Joffroy, where the lesion was limited to the lower portion of the cervical enlargement, the hand was maintained in a position of exaggerated extension, the phalanges were slightly flexed on the metacarpal bones and upon one another, and the thumb was extended and its metacarpal bone drawn backwards so as to be nearly on the same plane as the metacarpal bones of the fingers. (Fig. 2.) The position of the hand indicated that the roots of the ulnar and median nerves stand at a lower level in the cord than those of the musculo-spiral nerves. A somewhat similar case was under the care of my colleague, Dr. Morgan, in the Manchester Royal Infirmary, two years ago. In this case there was distinct thickening of the spinous processes of the last cervical and first dorsal vertebræ, but the deformity of the hand corresponded to that observed in my case of hæmorrhage into the cord. The flexors of the wrist were not completely paralysed, and consequently hyperextension of the hand at the wrist was only observed during a voluntary effort to grasp an object, and then the action of the extensors predominated and drew the hand into the position figured by Charcot. Seeligmüller[1] reports a case of infantile paralysis in which the flexors of the wrist and fingers and the intrinsic muscles of the hand were atrophied and paralysed, and the hand assumed a position like that of hypertrophic cervical pachymeningitis situated in the lower cervical region. My colleague, Dr. Leech, has a somewhat similar case in the adult now under his care.

A very important case has been described by Prévost and David[2] which appears not to conform exactly with these conclusions. The subject was a man, aged 60 years, who died of typhoid fever. He had complete atrophy of the muscles of the thenar eminence of the right hand, dating from childhood. The anterior root of the eighth cervical nerve of the right side was notably diminished in size, as compared with that of the left side, and the anterior root of the seventh nerve on the right side was also slightly diminished. The anterior grey horn opposite to the atrophied root was considerably diminished in size. The lesion had a longitudinal extent of about 2 cm.; its greatest transverse extent was opposite the eighth nerve, and it gradually decreased in size both upwards and downwards. Although the muscles of the thenar eminence are the only muscles mentioned as having been completely atrophied, it is quite possible that many other muscles might have been more or less enfeebled during life. At any rate I can think of no better way of accounting for the greatest extent of the lesion having been found on a level with the eighth instead of the first dorsal nerve, as one would have expected, if the muscles of the thenar eminence were alone implicated in the disease.

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[1] *Jahrb. für Kinderheilk.* No. xiii. p. 333.

[2] *Archiv. de Physiologie*, serie ii. tome i. 1874, p. 954.

RECENT RESEARCHES ON TUBERCLE, AND THEIR BEARINGS ON THE TREATMENT OF CONSUMPTION.

BY ROBERT SAUNDBY, M.D. EDIN., M.R.C.P. LOND.,
Assistant Physician to the General Hospital, Birmingham.

THE history of tubercle, ever since its first description by Laennec, has been a history of controversies. The rival schools of Paris and Montpellier in Laennec's time fiercely debated the question whether its origin were inflammatory, as Broussais maintained, or a "deposit," as Laennec held. In our time there has always been a very strong school following the teaching of Alison, Addison, and Niemeyer, which regards tubercle, at least so far as it constitutes the common lesion in pulmonary phthisis, as the consequence of inflammation, often strumous in character.

All attempts to establish a histological criterion to determine the specific nature of a supposed tubercular lesion, from Lebert's tubercle corpuscle to Schüppel's giant cell system, must be regarded as having failed.

Rindfleisch's view that tubercle is an infective process originating in caseous material, was supported by the experiments of Villemin, Klebs, Cohnheim, and others, who found that caseous matter introduced under the skin of rabbits and guinea-pigs produced tuberculosis; but this theory fails to explain those cases of spontaneous tuberculosis in man in which no cheesy focus can be found; and moreover, the experiments just named were somewhat invalidated by the contradictory results obtained by other experimenters, and also by the fact that tuberculosis followed the introduction of many other substances besides caseous matter, even blotting-paper and gutta-percha! (Cohnheim, Fränkel.)

But more recent experiments with tubercular matter itself have been more decisive. Tappeiner succeeded in producing tuberculosis in dogs—animals not liable to spontaneous tuberculosis—by making them inhale phthisical sputa distributed by a spray producer; while similar experiments with non-tubercular sputa and pus gave no result. These experiments were very numerous, and had the advantage of being performed in Virchow's laboratory, the autopsies of the dogs and the descriptions of the lesions being made by his assistants.

In addition, more precision has been introduced into the inoculation experiments by the plan of introducing the morbid material into the anterior chamber of the eye instead of under the skin; by this means tuberculosis of the iris is produced, and owing to its situation the evolution of the lesion can be watched from day to day. Such experiments have been made by Cohnheim, Baumgarten, and Solomonson, and their results strengthen the view that tubercle is a specific disease, capable of propagating itself by infection.

The infective nature of tuberculosis was insisted upon very strongly by Cohnheim in his pamphlet[1] published two years ago, which attracted very general attention. He insisted that this constituted the sole criterion of tubercle; that is to say, given a certain diseased animal tissue, its tubercular nature could be proved only by observing the consequences of introducing a portion of it into the body of another animal. Such a view of tubercle necessarily involved, with pathologists like Cohnheim and Klebs who are thoroughgoing germ-theorists, a belief in the existence of some specific organism.

Cohnheim himself has described what he called the *monas tuberculosum*, a micrococcus which, however, Deutschmann has shown to be incapable of giving rise to tubercle when freed from all admixture with caseous material.[2] Klebs and Schüller also described "micrococcus spheres" in tubercle, and Aufrecht found micrococci and short rod-shaped bodies in inoculated tubercles.

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[1] *Die Tuberculose vom Standpunkte der Infectionslehre.* Leipzig, 1880.

[2] *Centralblatt f. d. med. Wissenschaft.* 1881, No. 18.

Eklund, a Swedish naval surgeon, described two years ago an organism which he regarded as the specific fungus of tubercle, and to which he gave the name of *micrococcus phthisis dryotemenos;* and we are now only just recovering from the *furore* created by the announcement almost simultaneously of the discovery of the *tubercle bacillus* by Koch[1] and Baumgarten.[2]

However much ground there may be to dispute Koch's claim to absolute priority of discovery, there can be no doubt that the splendid series of investigations which he has recorded place him in the front rank of workers in this particular department.

Koch has shown (1) that the examination of a very large number of cases of tubercle in man and animals, including bovine tuberculosis, reveals the constant presence of bacilli, slender rods, one-quarter to one-half as long as the diameter of a red blood-corpuscle; (2) that these bacilli behave in a characteristic matter with certain staining agents, *e.g.* retaining the colour of methyl blue when this is discharged from the tissues in which they lie; (3) that these bacilli may be cultivated out of the body, on gelatine, and separated from all contamination by frequent transplantation and breeding for weeks and months, and are then capable of producing typical tubercle of the iris when introduced into the anterior chamber of the eyes of rabbits, or general tuberculosis when injected into the abdominal cavity or the blood-stream of cats and dogs.

Following on this, Dr. Ehrlich, by a modification of Koch's method, succeeded in identifying the tubercle bacilli in phthisical sputa.

I am not disposed to regard the behaviour of the bacilli with staining agents as *per se* satisfactory evidence of their identity, but Koch's cultivation experiments and successful inoculation of the fungus after repeated transplantations require only independent confirmation to establish the existence of the tubercle bacillus as an incontrovertible fact, like that of the bacillus of spirillum fever, anthrax, &c.

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[1] *Berl. klin. Wochenschrift*, April 11, 1882.

[2] *Centralblatt f. d. med. Wissenschaft*, April 15, 1882.

It is of course still undetermined what value we must ascribe to these bacilli, whether for example we shall agree with Cohn in regarding the fungus as the direct agent in the production of the disease, or follow Nägeli and Pasteur in believing that although transmitting the virus, yet that this was originally independent of them, or failing to accept either of these views, content ourselves with saying that we are not at present able to determine the relations which exist between the organisms and the pathological conditions in which they are found.

Fokker's experiments on the anthrax bacillus show at least that there is need for further investigation of these relations. He points out that mice inoculated with anthrax bacilli often die without any bacilli being found in their blood or tissues, yet from them a long series of cases may be fatally inoculated, and after the virus has passed through the systems of many individuals the bacilli may again appear in the blood. An additional doubt is thrown upon the question by the well-known fact that the presence of the spirillum in the blood of relapsing fever is by no means constant, and this inconstancy has not yet been properly explained.

Having thus reviewed the past history of the discussions on tuberculosis, there is good reason to blush at the manner in which Koch's experiments were served up to form the subject of leading articles in the daily papers; that a new era in the treatment of consumption should have been so loudly proclaimed, and that even our medical papers should teem with articles on the antiseptic treatment of consumption conceived in the same spirit of optimism.

The "antiseptic treatment" of consumption is certainly no novelty, but has been extensively and carefully carried out for some years.

Our memories must be very short if we have forgotten already the stir made in Germany three years ago by the statements of Rokitansky concerning the cures effected by means of the inhalation of a spray of sodium benzoate; or that Dr. Guttmann showed that such treatment, carefully carried out in thirty-one persons, failed to lower temperature, lessen night sweats, affect the body weight, or relieve a single symptom in any one case.

Variously modified means of applying antiseptic agents to the diseased pulmonary tissues have been devised by Dr. W. Roberts, Dr. Coghill, Dr. G. H. Mackenzie and others, including myself. My own personal experience of the treatment has been very considerable, and while I am satisfied that it is a valuable and rational method for allaying cough, diminishing expectoration, and indirectly promoting the healing of the inflamed and ulcerated pulmonary tissues, I have seen nothing to lead me to modify my own views or to desire to modify the views generally held as to the gravity of the prognosis of pulmonary consumption. If analogy can be allowed to guide us at all in such a matter, the antiseptic treatment should precede the development of the signs of pulmonary phthisis, if we are to expect any advantage from it at all comparable to that which has made Mr. Lister's name famous in modern surgery.

As I have pointed out in a former paper, the experience of antiseptic surgery, so far from encouraging us to expect a like good result by the use of carbolic acid in consumption, should rather warn us to expect nothing. Surgeons have not found that carbolic acid is of any special service in the treatment of surgical tubercular diseases; cod-liver oil and sea air are still needed to promote the healing of wounds in strumous subjects; and finally, but by no means least in importance, antiseptics are known to be of small value when the wounded surfaces have been for some time exposed to the air, especially when they are deep-seated, irregular, and practically out of reach.

It is possible that further investigations may discover some means by which the tubercle bacillus may be readily destroyed, and I would suggest the importance of special inquiries in this direction. It may be that such means could be applied to the lungs in some more efficient way than is possible with carbolic acid. But while these are possibilities, the experience of the past warns us against indulging in too optimistic dreams of the therapeutic advantages to be derived from these discoveries. We do not possess a cure for relapsing fever or anthrax, nor has it been worth anyone's while to announce that Eklund's discovery of the *bacillus lepræ* is the foreshadowing of knowledge mightier still, which shall cleanse the leprous skin, heal the ulcered limbs, restore the blighted features, and make the flesh again like the flesh of a little child. Such a consequence, wonderful as it would be, would not be more strange or more illogical than those which have been put forward as the probable results of Koch's researches on the tubercle bacillus, but we have not a large number of wealthy lepers in England, or no doubt we should have heard of it.

BISMUTH IN DYSPEPSIA OF CHILDREN.

BY E. W. DUNBAR, M.D. (ZÜRICH), M.K.Q.C.P.I.

Loss of appetite in children with pain after eating, nausea, and depression, if accompanied by a tongue either clean or slightly coated, but showing redness and enlargement of the papillæ fungiformes, is quickly relieved by administration of bismuth, either in the form of the subnitrate or of the solution of the oxide in ammonia and citric acid as discovered and prepared by Mr. Schacht. The dyspepsia, which is characterised by the described appearance of the tongue, is produced by indigestible food. If the tongue is coated the dyspepsia is recent, and it is chronic and of some duration if the tongue is clean; loss of appetite and consequent diminution in the amount of food taken having given opportunity for the tongue to clean.

The digestion of children being easily disturbed, this form of dyspepsia may very frequently be observed among them. It is often necessary to persist in the use of bismuth for several weeks before the papillæ fungiformes resume their normal appearance and a lasting cure is effected, although improvement shows itself quickly in the appetite and returning liveliness and cheerfulness of the little patient. The action of bowels is as a rule markedly improved and more regular, especially if the liquor bismuthi is used: exceptionally the bowels are rendered more constipated and it is necessary to give a mild aperient occasionally.

While testing the accuracy of the described indication for the use of bismuth I prescribed it, owing to the state of the tongue, in the case of a child who had an obdurate cough that had resisted all the usual remedies for subduing irritation of the larynx. The cough ceased with the improvement which quickly succeeded the dyspeptic symptoms. The dulness and languor produced by this form of dyspepsia in children may easily be mistaken, especially if the tongue is clean, for weakness and a condition requiring tonic treatment. The marked distaste for food and the characteristic tongue point to the true nature of the ailment.

The dose of liquid bismuth varies from two minims under one year to three, five, ten, fifteen, and twenty minims up to twelve years of age; the dose to be repeated twice or four times a day according to the severity of the symptoms. The remedy appears to be most effectual when taken after meals. The subnitrate may be given in doses of one half grain up to two, three, and five grains.

Bismuth is quite ineffectual in the dyspepsia of children where the tongue is smooth, clean, and shows no enlargement or redness of the papillæ fungiformes.

ANATOMICAL AND EXPERIMENTAL INVESTIGATIONS MADE DURING THE YEARS 1868-69, RELATING TO THE COMMUNICATION OF TUBERCLE BY INOCULATION, AND THE PATHOLOGICAL NATURE OF THE LESIONS RESULTING THEREFROM.

BY J. BURDON SANDERSON, M.D., F.R.S.[1]

[The experimental and anatomical researches which are embodied in the following Reports on Tuberculosis Infection have lately acquired a new and special interest in consequence of the recent discoveries of Dr. Koch and of the renewed inquiries to which these are already giving rise in this country. Papers on medical subjects, which are issued in Blue Books, however important, become in general little known to the profession, for the existing arrangements for the distribution of scientific information paid for by the public are such as to place obstacles in the way of their coming into the hands of persons capable of understanding or using it. The two "Reports" which we now reproduce are wholly inaccessible, having been out of print for years. The first of them, which contains the results of Dr. Sanderson's own experimental and pathological work, we reprint without alteration, omitting only the details of the experiments of previous investigation, which in the original are given in detail. The second Report, published a year later (1869), is in the nature of an Appendix to the first. From this, such parts have been extracted as appeared to the author to be of value for the illustration or completion of its predecessor. The general conclusions with which the paper ends are also derived from the second paper.]

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[1] Tenth Report, 1867, published 1868.

The investigations to which the following report relates, were undertaken in co-operation with the Medical Officer of the Privy Council for the purpose of testing the truth of certain statements recently made on high scientific authority, as to the effects of inoculating animals with morbid products derived from persons affected with tubercular disease, and of determining to what extent, and under what conditions, this or other allied diseases of man can be transmitted to the lower animals.

The problems which appear to me to be comprised within the scope of such an inquiry may be stated as follows :—

1. Is it true that the inoculation of tuberculous matter produces in the lower animals morbid changes, so constant in their anatomical character and development that they may be regarded as constituting a disease? And if so, in what terms can it be defined?

2. In what respects do the morbid results produced by the inoculation of tubercle resemble or differ from other diseased conditions communicable by the same process, particularly pyæmia, glanders, and syphilis: and to what extent are they comparable with the effects produced by the introduction into the circulation of inert solid matter in a state of fine division?

PART I.—INOCULATION OF TUBERCULOUS MATTER.

For the determination of the first question, experiments have been made on 53 guinea-pigs. Of these, 30 were inoculated directly with diseased material from tuberculous patients, and 23 with material taken from the diseased organs, or with the blood, of animals previously inoculated. Of the latter, 13 were inoculated directly from animals of the first series, which in their turn yielded material for the inoculation of the remainder. Of these animals some are still under observation, but a sufficient number have died of the effects of inoculation, or have been killed for anatomical purposes, to enable me to report fully on the structural characters and development of the lesions produced. The quantity of material used in each inoculation was extremely small. The mode of insertion employed will be described below.

FIRST SERIES.—INOCULATION OF HUMAN TUBERCLE.

OBS. I., *April* 16th.—Three guinea-pigs were inoculated with tuberculous material from the pia mater of a patient who had died three days before in the hospital for sick children, under the care of Dr. West. The patient, a boy aged four years and seven months, had been admitted six days before his death with symptoms of tubercular meningitis, the disease having already existed three weeks. His health had been good until two months previously, when he had an attack of scarlatina, from which, however, he recovered, and remained well until the 25th of March, when a succession of convulsive seizures occurred, ushering in his fatal illness. The following were the results of the post-mortem examination :—On removing the calvarium and dura mater the convex surface of the hemispheres was seen to be moist, and the convolutions were flattened. The intervals between them, especially round the branches of the middle meningeal artery, were beset with granular deposit, which, however, was strictly limited to the sulci. The sectional surfaces of the brain were moist and pale, and the ventricles were distended with serum. The surfaces of the corpora striata were roughened with minute granulations, and the septum lucidum was ruptured. On examining the base of the brain the pia mater covering the interpeduncular space was seen to be much thickened and hyperæmic. The thickening extended into the sylvian fissures, both of which were blocked up by exudation, and on opening up the right fissure, a mass of tuberculous matter as large as a filbert was exposed. All the other organs were carefully examined, but no trace of tubercle could be discovered.

On making sections of the mass of the right sylvian fissure it was found to be partly grey and semi-transparent, partly white and opaque. The grey parts consist of a transparent matrix, in which innumerable round or oval nucleated cells and nuclei are embedded. The diameter of each cell scarcely exceeds that of its nucleus. In some parts of the structure the nuclei, instead of being round or oval, present all intermediate forms between the spheroidal and those usually found in the connective tissue of the pia mater. The opaque white parts appear to consist of granular stroma, in which nuclei are still to be observed in greater or less abundance. Similar appearances present themselves in the thickened pia mater at the base of the brain. Not only here, but on the surfaces of the corpora striata, the vessels of the affected parts exhibited the usual changes. The multiplication of nuclei or nuclear cells had taken place in the sheaths of many of the capillary arteries to such an extent as to conceal their natural structure.

The three animals were inoculated from the tuberculous mass above described. The method employed consisted in passing a narrow-bladed scalpel under the skin, and then inserting the material into the wound with a pair of fine-pointed forceps.

No. 1. The animal was killed 56 days after inoculation. Morbid appearances were observed at the seat of insertion, in the lymphatic glands, in the spleen, liver, and lungs. The spleen was employed to inoculate three other animals. (See Obs. XI.)

No. 2. Killed 70 days after inoculation. The same organs were diseased. Three healthy animals were inoculated with morbid matter from the spleen, and three others with the blood. (See Obs. XII. and XIII.)

No. 3. Killed 93 days after inoculation. The lungs were healthy, the liver was scarcely at all diseased, but the spleen and lymphatic glands, as well as the subcutaneous cellular tissue at the seat of inoculation, exhibited the same appearances as in the other two animals.

Obs. II., *May* 2nd.—Four guinea-pigs were inoculated with sputum, collected three hours previously, of a patient affected with phthisis in the third stage, under the care of Dr. Quain, at Brompton Hospital. The patient died on the 16th of June, when the following appearances were noticed:—There were extensive and firm adhesions of both pleuræ. The right lung was for the most part crepitant, but beset with grey granulations, the smallest of which were semi-translucent. There was a small cavity near the apex, the base of the lung being hyperæmic and airless. The left lung was much contracted, of fibro-cartilaginous consistence, and perfectly airless. At its upper part was a large cavity containing much grumous fluid, and smaller cavities were scattered here and there throughout its substance. The pericardium was adherent by both its surfaces, and was much thickened. When stripped off the heart it left a surface roughened with shaggy lymph. With the exception of ulceration of the ileo-cæcal valve there were no important lesions of other organs.

The material used for inoculation was purulent and creamy sputum, here and there streaked with blood. It was found on microscopic examination to consist of pus-cells, ropy mucus containing albuminous granules and oil globules, shreds of lung tissue, and sporules of fungi.

The animals were inoculated with an instrument devised for the purpose. It was similar to that subsequently used (see Obs. III.) but less perfect.

No. 4. Died 54 days after inoculation. The lymphatic glands, lungs, liver, and spleen were diseased. The condition of the subcutaneous cellular tissue was not noted either in this or the following case.

No. 5. Died 51 days after inoculation. All of the internal organs were diseased.

No. 6. Died 75 days after inoculation. The usual appearances were observed at the seat of insertion, in the lymphatic glands and in the internal organs.

No. 7. Killed 77 days after inoculation. There were no morbid appearances.

Obs. III., *May* 10*th*.—Two guinea-pigs were inoculated with recent expectoration of a female patient, admitted into Brompton Hospital on the 9th of March, under the care of Dr. Quain. Death occurred on the 13th of May. The record of the post-mortem examination (at which I was present) was unfortunately not entered in the hospital register. At the time that the expectoration was collected the patient was in a state of extreme prostration, accompanied with the usual symptoms of the final stage of phthisis. The physical signs afforded evidence of extensive disintegration of the upper parts of both lungs, and of the existence of one or more large cavities at the apex of the left lung. This diagnosis was verified after death.

The sputum consisted of pus-corpuscles similar in character to those above described. It contained fatty and albuminous granules, and various forms of fungus growth, viz., hyphaceous filaments, and spores of two varieties, one of which exhibited a necklace-like arrangement.

The instrument used for these and all subsequent inoculations consists of a steel canula, about three-fifths of a line in diameter, pointed at one end like the tube of a subcutaneous injection syringe, and fitted with a steel rod, which is of the same length and bevelled in the same manner as the canula. In using it, the material to be inoculated, if liquid, is drawn into the pointed end of the tube by pulling back the rod or piston for a line or two. If it is intended to employ solid matter, the instrument is easily charged by introducing the material into the same part of the tube with the aid of a pair of fine forceps. In inoculating, the point is passed under the skin to such a distance as to cover the whole of the bevelled part in the same manner as in hypodermic injection, and the material pushed out with the rod. In this way the insertion is accomplished with the utmost certainty, and with the least possible injury to the subcutaneous cellular tissue.

No. 8. Killed 69 days after inoculation. There were suppuration in the course of the wound, enlargement and softening of the subcutaneous lymphatic glands, and advanced disease of the spleen, liver, and lungs.

No. 9. Died 78 days after inoculation. The morbid appearances were similar to the last.

Obs. IV., *May* 14*th*.—Two guinea-pigs were inoculated with caseous material from the lung of the patient whose sputum was employed in Obs. III., who had died two days previously.

No. 10. Died 45 days after inoculation. Disease existed at the seat of inoculation, in the spleen, liver, and lungs.

No. 11. Killed 65 days after inoculation. The morbid appearances were of the same nature, but the lesions found in the internal organs were more advanced.

Obs. V., *May* 28*th*.—Two guinea-pigs were inoculated, one (No. 12) with miliary tubercle from the lung, the other (No. 13) with miliary granulations from the peritoneum of a patient who died in acute tuberculosis in Middlesex Hospital, under the care of Dr. Goodfellow. The morbid appearances were as follows: —Both pleuræ were studded with minute semi-transparent granulations, the right being partially adherent. Grey miliary granulations were disseminated abundantly throughout both lungs, especially the left, but *no deposits of old tubercle could be discovered.* The under surface of the diaphragm and the serous coverings of the liver and spleen were dotted with granulations, those on the liver having membranous shreds attached to them. The liver substance appeared normal to the naked eye, but on microscopic examination "numerous minute aggregations of nuclei, having all the characters of tubercle" (Dr. Cayley), were found to be disseminated through it. Several opaque yellow nodules existed in the kidneys, the size of which varied from that of a millet seed to that of a hemp seed. There were small tubercular ulcers in the ileum, particularly in Peyer's patches, and the corresponding mesenteric glands were enlarged. The pia mater was injected and œdematous, and grey granulations were observed in the sylvian fissures. No other morbid appearances were detected.

No. 12. Died 31 days after inoculation. There was disease of the spleen, lungs, and liver. The lymphatic glands were also diseased, but the state of the wound was not noted.

No. 13. Died 45 days after inoculation. There was suppuration in the course of the wound, with enlargement and softening of the lymphatic glands; the internal organs exhibited the usual appearances.

Obs. VI., *May 28th.*—Three small guinea-pigs were inoculated with infiltrated tubercle (caseous pneumonia) from the right lung of a female patient, aged 22, who died in Brompton Hospital the day before, under the care of Dr. Pollock. The condition of the diseased organs was as follows:—There were firm adhesions of the right pleura towards the apex, the rest of the pleural cavity containing coagulated blood, the origin of which was not ascertained. The right lung, with the exception of the posterior part of the lower lobe was densely infiltrated with solid tuberculous material. Near the apex there was a small cavity containing grumous fluid. The left pleura, which was slightly adherent, and the left lung was free from tubercle excepting at its apex, where there were a few small masses of consolidation. The other organs were healthy.

No. 14. Died 44 days after inoculation.

No. 15. Killed 54 days after inoculation.

No. 16. Killed 54 days after inoculation.

In all these animals the lymphatic glands, spleen, lungs, and liver were diseased. In No. 16 there were also nodular deposits in one of the kidneys. The inoculation wound and the surrounding subcutaneous cellular tissue exhibited the usua appearances.

Obs. VII., *May* 28*th*.—A guinea-pig was inoculated with material from marginal infiltration surrounding an intestinal ulcer in a female patient, aged 43, who died the day before in Brompton Hospital, under the care of Dr. Alison. The condition of the organs was as follows:—The upper two-thirds of the left lung were infiltrated with grey deposit, the lower third containing air. The right pleura was firmly adherent, and the right lung was scattered with tuberculous masses. There were numerous ulcers of irregular form with thickened margins in the cæcum and ascending colon; rounded ulcers of similar character were met with at intervals towards the lower end of the ileum, some of which were as large as a florin. The other organs presented no lesions of importance.

No. 17. Killed 54 days after inoculation. The pathological appearances observed at the seat of inoculation, in the lymphatic glands, and in the internal organs, were of the same kind as in the other experiments.

Obs. VIII., *May* 31*st*.—Three guinea-pigs were inoculated with miliary tubercle from the lung of a female patient, aged 27, who died at the Brompton Hospital three days previously, under the care of Dr. Pollock, of acute tuberculosis complicated with cerebral symptoms. Both lungs were scattered with miliary nodules of grey semi-transparent material; the pleura was in some parts natural, in others more or less opaque as if infiltrated with opalescent deposit, while in others it was studded with numerous granulations, some of which were exceedingly minute, others as large as hemp seeds. These on microscopic examination were found to consist of nuclei of various forms and sizes, which appeared to be grouped in greatest abundance in the neighbourhood of minute arteries. The pia mater exhibited no appearances of disease which could be recognised by the naked eye, but on microscopic examination it was found that there was multiplication of nuclei in the sheaths of the capillary arteries.

No. 18. Died 98 days after inoculation.

No. 19. Died 28 days after inoculation.

No. 20. Died 56 days after inoculation.

In each case the lymphatic glands, liver, and spleen were diseased; the lungs were diseased in No. 18, but were free from disease in Nos. 19 and 20.

Obs. IX., *June* 10*th*.—Two guinea-pigs were inoculated from tuberculous deposit in the great omentum of a patient who died in Brompton Hospital, under the care of Dr. Alison. In this case the most important post-mortem appearances were as follows:—Both pleuræ were firmly adherent; grey, elevated miliary granulations were disseminated throughout the whole of both lungs. The bronchial tubes were dilated and the bronchial mucous membrane thickened and injected. The bronchial glands were enlarged and indurated. The heart was firmly adherent to the pericardium, the aortic valve atheromatous and incompetent. The peritoneal cavity contained about two pints of greenish fluid. The mesentery was scattered with grey granulations. The omentum was thickened and indurated, and formed a hard mass, which during life had been felt through the abdominal wall. The spleen was enormously large and hyperæmic, and contained masses of cheesy deposit. In the cortical substance of the kidney there were also several nodules of cheesy material. The mesenteric glands were much enlarged and indurated.

No. 21. Died 108 days after inoculation.

No. 22. Died 93 days after inoculation. With the exception that the morbid processes were more advanced in all the organs, the appearances corresponded with those previously observed.

SUMMARY OF PATHOLOGICAL APPEARANCES OBSERVED IN THE ABOVE 22 ANIMALS.

1. *Appearances observed in the wound produced by inoculation, and in the surrounding areolar tissue, and in the subcutaneous lymphatic glands.*

In the animals first dissected my attention was not drawn to the importance of these appearances, so that the following statement is based on the dissection of nine animals only, viz., Nos. 3, 8, 11, 15, 16, 17, 18, 20, and 21. The morbid alterations observed consisted in (1) induration and thickening of the subcutaneous connective tissue; (2) formation of pus in the track of the wound; (3) formation of secondary subcutaneous abscesses in its neighbourhood; and (4) formation of bands of induration, analogous to farcy cords, between one abscess and others in its neighbourhood. In each of the nine animals referred to there was evidence that suppuration had taken place in the track of the wound; in all excepting one (No. 3) an abscess actually existed at the time of the dissection; in the exceptional case there was an open wound from which pus had escaped. The induration varied in extent; it was usually considerable, forming a hard ridge by which the course of the inoculating instrument could be traced before the skin was removed. In five of the animals numerous abscesses were found in the neighbourhood of the wound. In the four remaining, although there were no abscesses, there was much thickening and condensation of the subcutaneous tissue, which often proceeded to a considerable distance from the seat of the inoculation.

The pus found in the primary traumatic abscess, as well as that which occupied the secondary abscesses in its neighbourhood, varied in character according to the time that the abscess had existed; it never possessed either the fluidity or the characteristic yellow colour of normal human pus, its consistence varying from that of cream to that of cream cheese, which it also resembled in colour. Under the microscope it exhibited the following elements:—

In recently formed abscesses the majority of the corpuscles presented characters which do not appear to me to be distinguishable from those of normal human pus. These corpuscles measured from $\frac{1}{2500}$ to $\frac{1}{2000}$ of an inch in diameter, and exhibited when treated with very dilute acetic acid from two to four highly refractive granules, forming a central nucleus. Along with these were always observed other corpuscles of less uniformly spheroidal form, which resembled conglomerates, and usually contained a greater or less number of fat granules. These were much larger than the ordinary pus corpuscles, their diameter being from $\frac{1}{1200}$ to $\frac{1}{800}$ of an inch. In the older abscesses, that is those in which the pus had become cheesy, a marked difference was observed in the character of the corpuscles, and particularly in their conduct when acted upon by weak acetic acid. This reagent was found to have lost its power of resolving the corpuscles into a bifid, trifid, or quadrifid nucleus enclosed in a zone of transparent substance; in short, the corpuscle was comparatively little altered by the acid, and retained a distinctly globular form. The larger glomeruli were found in much greater numbers in the caseous than in the creamy abscesses, and in some instances appeared to be the only corpuscular elements.

The structural character of the connective tissue indurations was observed (1) in the cords of induration, connecting one abscess with another, and (2) in the walls of the abscesses. The cords were found to consist of a dense fibrillated stroma, in which the direction of fibrillation was parallel to the axis of the cord. This stroma was not in the slightest degree wavy, and when fine sections of it were made in the direction of fibrillation it was found to be studded with innumerable staff-shaped nuclei, all of which assumed the same direction as that of the fibrillation. . . .

In making sections of walls of abscesses it was found that they always presented the same structure, viz., that they invariably consisted of condensed connective tissue, having the same character as that which forms the cords of induration. This tissue was continuous, externally, with the normal subcutaneous tissue. Internally, the abscess wall was lined by a layer of pulpy substance. This material (so called pyogenic membrane) was found, when examined separately, to consist of spheroidal cells embedded in the meshes of a reticulated transparent stroma; when examined in sections made perpendicularly to the abscess wall it could be satisfactorily made out that this stroma was continuous with that of the dense fibrillated connective tissue on which the pyogenic membrane rested . . .

It has already been stated that in many cases there is no suppuration at the seat of inoculation. This was particularly observed when material taken fresh from the diseased lymphatic glands of previously inoculated animals was used. In such animals, if killed within four weeks of inoculation—

[. . . the only morbid alteration which can be discovered consists in the existence at the seat of inoculation of a knot of hardened and thickened skin. On making a section of the diseased part, and examining it with a lens, it is seen that the hard mass lies immediately under the true skin, of which in fact it seems to form a part; and that it consists of an aggregation of smaller masses, separated from each other by more or less irregular bands of connective tissue. At a later period, that is to say seven or eight weeks after inoculation, other nodules are found in the neighbourhood of the original one, which, excepting that they are more disseminated, resemble the little masses already referred to, each being enclosed in an indistinct capsule of reticular connective tissue similar in character to that which enters into the composition of the nodule. On examination of the smallest of these granulations in the recent state, nothing can be discovered excepting that it is a mass of round cells like lymph corpuscles. In sections of hardened tissue it is found that these corpuscles are enclosed in a fine meshwork of fibres, which in structure resemble that of a lymphatic gland in incipient fibroid degeneration. . . . Of the relation of these subcutaneous nodules to the lymphatic capillaries I regret to say that I know nothing, as I have altogether failed to trace these vessels in the diseased tissues. . . . In the loose connective tissue between the muscular and tendinous layers it is common to find minute granulations, some of which are so small as to require a lens for their detection. On superficial examination these might be regarded as of the same nature with those found in the cutis. That they are really inflammatory in their origin is indicated by the large size of the cells, and their obvious development from connective tissue corpuscles, as well as by the absence of any reticulum. I have never observed any change in the muscular or tendinous tissues themselves.]

In all the animals the subcutaneous lymphatic glands were more or less diseased, the changes consisting in enlargement (hyperplasia), induration, and caseous degeneration; this last resulting either in softening or in the formation of cretaceous concretions. In every instance those glands were most affected which were in the neighbourhood of the inoculation wound. As therefore the insertion was usually made in the shoulder, the axillary glands, as might be readily anticipated, were the principal seat of disease. So constantly indeed was this the case, that it could always be discovered whether an animal was diseased or not by pressing the finger in the axilla. In the healthy guinea-pig two glands can be distinguished in the axillary region as being much larger than the rest; one lies close to the axillary artery, where it crosses the shoulder-joint; the other is situated near the posterior edge of the scapula in the angle between the triceps muscle and the teres maximus. The latter, which in the guinea-pig is more frequently diseased than any other, will be hereafter referred to as the scapular gland. The other subcutaneous glands which are apt to be affected are those which lie on either side of the trachea (tracheal glands), and those near the sub-maxillary salivary glands (sub-maxillary glands). The inguinal glands are also occasionally diseased.

The enlargement of the glands was enormous. In the greater number of animals the scapular gland had attained 40 or 50 times its normal weight, and five or six times its natural length. Enlargement was never observed without other changes. The hypertrophied glands always exhibited in section patches of white or yellowish opacity of the cortical substance, indicating the commencement of caseous degeneration. The condition of the glands, as of the subcutaneous areolar tissue, was carefully investigated in nine animals only. In three of these, Nos. 16, 17, and 20, there was hypertrophy, with induration and cheesy degeneration. In the six remaining animals the scapular gland on the same side as the inoculation wound was converted into an abscess containing creamy or cheesy pus, and in one of these animals, No. 21, the tracheal glands of the same side were in a similar condition. It was further observed, with reference to these nine guinea-pigs, that the three cases in which there was no suppuration of the glands were precisely those in which there were no abscesses under the skin in the neighbourhood of the inoculation wound, so that there was reason to regard the softening of the lymphatic glands as dependent upon the same conditions as the dissemination of purulent foci in the subcutaneous tissue.[1] . . .

2. *Appearances observed in the Lungs.*

Of the 21 guinea-pigs successfully inoculated the lungs were found free from disease in three only. In the rest the lesions observed consisted in the formation of nodules of grey induration, which were disseminated in 14 of the cases, partly disseminated, partly confluent in the rest. These changes were in two animals associated with adhesive pleurisy, viz., in Nos. 10 and 21.

In the healthy guinea-pig the lungs weigh about four grammes, that is about one-hundredth part of the weight of the body. When altered by adenoid deposits they often weigh as much as 15 grammes. In those cases in which the nodules are small and much disseminated the weight scarcely exceeds the normal. The increase of weight due to the new growth was most considerable in those in which the duration of life after inoculation was greatest; thus, in three animals which, when dissected, had been inoculated respectively 93, 98, and 108 days, the weights were severally 2·2 per cent., 3·7 per cent., and 4·9 per cent. of the weights of their bodies.

As has been stated, the new growth either assumed the form of disseminated nodules or pervaded the tissue of the lung to such an extent that considerable portions of the organ were consolidated. There was, however, evidently no essential difference between the two forms of lesion, for in those cases in which the induration was continuous in some parts, it was constantly observed that there were disseminated nodules in others, and that the material of which the nodules were composed was identical in all its characters with that which formed the larger masses. We proceed to describe the nodular, which must be regarded as the primary form of the alteration.

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[1] This inference was confirmed by later experiments.

The nodules, when examined with the naked eye or with a lens, present great uniformity of appearance. They are always found in much greater numbers under the pleura than in the parenchyma of the lung. The sub-pleural surface of each nodule is slightly convex, so that it projects more or less above the general surface of the pleura, exhibiting itself as an iron-grey patch, which contrasts strongly with the pink white hue of the healthy lung tissue which surrounds it. When the nodules are small the whole sub-pleural surface is convex, but in the larger nodules the centre of the patch is somewhat depressed, so that the margin forms an irregular annular prominence. On cutting through a nodule at right angles to the pleural surface it often appears to form a blunt cone, of which that surface is the base. The colour of the nodules is sometimes pale grey, but much more frequently it is steel grey or slate coloured, especially towards its margin: and on section it exhibits a similar colour. The smaller nodules have the semi-transparent appearance which is recognised as a characteristic of miliary tubercle. In the larger ones the translucency is confined to the external parts, the centre being opaque, and of softer consistence than the rest. There are, as may readily be understood, great differences as regards size. In two of the animals they were all no larger than pin-heads, while in others the diameters varied from one-fiftieth to one-tenth of an inch. From their form and structural relations it is evident that they are interstitial new growths which do not displace the lung tissue, but are incorporated with it and form part of it. In order to satisfy one's self of this fact, all that is necessary is to examine those nodules which happen to lie near the sharp margins of the organ. It is then readily seen that the form which each nodule assumes is not its own, but that of the organ in which it grows, and that the space it occupies is often not greater than that which would have been occupied by the corresponding portion of lung in the natural state.

(To be continued.)

Reviews

The Human Brain: Histological and Coarse Methods of Research. A Manual for Students and Asylum Medical Officers. By W. Bevan Lewis, L.R.C.P., Deputy Medical Superintendent to the West Riding Lunatic Asylum. London: J. and A. Churchill. 1882.

The publication before us shows that the ardent devotion to scientific work which characterised the medical officers of the West Riding Lunatic Asylum a few years ago, under the able superintendence of Dr. Crichton Browne, has not yet died out. Dr. Bevan Lewis, the author of this work, does not require to be introduced to the profession. His observations on the structure of the brain have already earned for him a high scientific position, while his "freezing microtome" has made his name widely known amongst the younger generation of pathologists. The book is a reproduction of a series of articles in *Brain.* The first part of it deals with the coarse examination of the brain and its membranes. This part is generally well written, but if we were to single out any portion of it for special notice, we should say that the directions given for the examination of the larger venous sinuses is particularly worthy of the student's attention. The chapter on the physical properties of the grey and white substance of the brain, wherein directions are given for the determination of the capacity of the cranium, and the volume, absolute weight, and specific gravity of the brain, is also excellent. In the second part, which treats of the minute examination of the brain, the author describes the various forms of microtomes in general use, the different methods of hardening the brain, imbedding, section cutting, and staining, a number of useful formula being given for the preparation of staining fluids. Careful instructions are then given for the preparation of nervous tissues in the fresh state both by freezing and dissociation, the former method having yielded valuable results in the examination of the cortex of the brain in the hands of the author. The third and last chapter contains a very useful list of reagents and mounting media. As slight shortcomings in the work, we might notice that the author speaks of variations in the amount of cerebro-spinal fluid in the arachnoid sac, instead of the sub-arachnoid space, and that he speaks of exudation-corpuscles and the corpuscles of Gluge as if they were distinct structures, instead of being two names for the same thing. But the work taken as a whole is excellent, and we can strongly recommend it to all who are engaged in the examination of healthy or diseased nervous tissues.

The Influence of Vivisection on Human Surgery. By Sampson Gamgee, F.R.S.E. Second edition. 8vo. pp. 32. London: Churchill. 1882.

Experimental Physiology: its Benefits to Mankind. With Addresses on Unveiling the Statue of William Harvey at Folkestone. By Richard Owen, C.B., M.D., F.R.S. Post 8vo. pp. 216. London: Longmans. 1882.

The anti-physiological clamour of a couple of years ago or more owed its temporary hearing to several circumstances in their nature temporary. Medical men generally, who might naturally be expected to instruct the uninformed and doubting public as to the other side of the question, kept silence for a time. There were at least two classes of reasons for this. Some practitioners, whose boast is their strength in practice and their scant faith in "theory," were inclined to side against the "new school" of physiology. They had qualified without being required to show knowledge of new experiments and new views: at most they had acquired some of the results of physiology without being troubled about the methods. And chiefly, they had had small need or inclination to go deeply into the history of the evolution of their art, and were satisfied to accept the labours of their scientific ancestors, and base on them a therapeutic, intelligent and successful perhaps if not very progressive. The absence of a scientific foretraining and of teaching in physiology other than verbal led to a lack of sympathy with those who work out physiology by scientific methods. These medical men held their peace because they did not feel their kindred with, and dependence on, their scientific fellow-labourers. Their point of view scarcely differed from that of the laity, and they were little inclined to make common cause with what seemed a small extraneous body whose repute was called in question. The number of these medical men was not perhaps large, but we have had reason to think that their influence (negative at best, and sometimes hostile) was not small.

Another class of medical men held silence for a very different reason. They knew, none better, the incalculable gains that medicine had derived from physiology in the remoter and the nearer past. They looked forward to its further advance by the same methods more widely and more thoroughly applied. They could sympathise with the difficulties and discouragements of the experimental investigator, and were ready to hail with gratitude and keen appreciation the results he brought. With all this in mind it was inevitable that they should feel moved to despise in silence the clamour of uninformed agitators who condemned as iniquitous and useless their trusted and valued colleagues. Where, as it seemed, the case was so clearly one of ignorance and bias sitting in judgment on knowledge and desire for truth and the highest utility, there was no call to take up the defence. The clamourers stood plainly self-condemned. This attitude, though natural, could not be maintained when the agitators, growing bolder unanswered, gained more and more hearing and in ever higher places. It was time that those who knew should speak out to warn and direct those who did not know and were being misled. And their speaking, now that it has been heard, has already, in a large measure, done its work. The leaders in practical medicine have made known with unanswerable emphasis and effect how indissolubly the future of the healing art is bound up with that of the science of living function, and how indispensable to this is the method of direct experiment. More than that, they have shown how essentially true it is that almost all that has raised medicine from empiric guess-work to systematised knowledge is due mediately or immediately to experimental research. This has reacted on the supine practitioner as well as on the half-mispersuaded layman. The result manifests once more the core of common sense always to be found beneath the surface of English public opinion. The agitators preyed and presumed on general ignorance and equally general sentimentality and credulity. When the truth of the matter was set forth by trusted teachers and advisers, the basis of the agitation was hewn away. The tide has well turned. The unconvincible and misconsistent are already crying in the wilderness.

Mr. Gamgee's pamphlet should be read by every practitioner. He sets out clearly and with irresistible vigour the argument for experimentation derived from its essential usefulness, its indispensableness to the achievements which have made modern surgery almost miraculous. His knowledge of surgical history is full and ready, and as he cites one and another testimony from the epoch-making surgeons, whose names all the world knows and reveres, the most prejudiced antagonist who still can think, must be moved to feel humble and repentant.

Professor Owen's book is in another key, but the theme is akin. In his preface he announces that he publishes it with the view of fulfilling one purpose of the Association for the Advancement of Medicine by Research. In the words of the Master of the Rolls it is "most desirable that the public should be informed upon the matters contemplated by the Association." The book will do much, very much, to educate the public intellect and conscience. Its style is weighty and even elaborate, but it is shot through by gleams of vivid satire, of the illuminating kind, not the withering. As a zoologist accustomed to exact naming and defining he begins by devising an appropriate title for the anti-humanitarians "who work, speak, write, subscribe, and prosecute their kind in behoof of brute-beasts." The correct specific term for such a class should be based on *bestia* as that of the contrasted one on *homo:* so he calls them *bestiarians.* It is not a term of reproach: but, as all good names do, it connotes the truth of the thing. Then in order he answers the charges formulated by the Bestiarian Society, convicting the makers of them of inaccuracy, misunderstanding, and garbling (in the parliamentary sense). Abdominal surgery, antiseptic treatment, fevers, the pulse, nervous diseases, the discovery of new medicines, are then treated in separate sections, and each with knowledge and skill. The attempts to vilipend Harvey's work and Hunter's are admirably met and countered: it is to be hoped that the second and third-hand quotations which have played so large a part in Bestiarian literature, will have played their last after this. At the close, the later contributions to the question are resumed and commented on rather more in pamphlet style. This is effective perhaps, but it gives the book a certain unevenness which may jar on some. To practitioners who wish to set at rest the doubts of intelligent laymen as well as to inform themselves, the book will be of very great service.

Manual of Diseases of the Skin, with an Analysis of 8,000 Consecutive Cases, and a Formulary. By L. DUNCAN BULKLEY, A.M., M.D. (New York.) Fcap. 8vo. pp. 312. London: Churchill. 1882.

THIS manual is handy in form, and its formulary is abundant and likely to be useful. It professes to have grown out of class-room conversations, and to the students who took part in these it will be helpful as a reminder. But as it confessedly avoids pathology and differential diagnosis, we do not think that any student who possesses either "Duhring" or "Liveing" need trouble to get this book for anything new it contains.

The Medical Digest, or Busy Practitioner's Vade Mecum: being a Means of readily acquiring Information upon the Principal Contributions to Medical Science during the last Thirty-five

Years. By RICHARD NEALE, M.D. (London.) Second Edition. 8vo. pp. 643, lxxxii. London: Ledger, Smith, and Co., St. Mary Axe. 1882.

THE title of this very remarkable work corresponds truly with its function. It is an indispensable *vade mecum* to every one for whom the last thirty-five years of English medical literature has any message to bring, or lesson to teach—in other words, to every medical man who has not given up professional reading altogether. A great portion of the best writing and reading—literary, scientific, professional, miscellaneous—comes to us now at stated intervals in paper covers. The writer appears as it were in his shirt-sleeves. As soon as he has delivered his message, the bookbinder puts a coat on his back, and he joins the forlorn brotherhood of "back volumes," than which, so long as they are unindexed, nothing can be more exasperating. Who wants a lock without a key, a ship without a rudder, a binnacle without a compass, a cheque without a signature? asks Professor Wendell Holmes; and he goes on to say that "if indexing is the special need of our time in medical literature, as in every department of knowledge, it must be remembered that it is not only an immense labour, but one that never ends." Dr. Neale conferred an immense service on the entire profession when he published his first edition four years ago. He has added to it greatly by bringing his index up to the present. Not merely to practitioners who have access to great libraries, but to every one this book in and for itself has a value for what it suggests. Thus turning at random to "Infantine Convulsions—treatment" we find a string of references under the headings "Calabar bean, conium, bran tea (if intestinal), ol. terebinth., chloroform int. or inhal., ether, pot. iod., chloral, counter irritation, ice to spine, douche to head, lin. crotonis." Without looking up a single reference this list may contain just the suggestion one is looking for when in perplexity: the time when a suggestion is all that is needed. We may add that the *Practitioner* is included in this edition, though by mistake the abbreviation used (*viz.* P.) is not referred to in the list of abbreviations.

The Diagnosis of Diseases of the Spinal Cord. By W. R. GOWERS, M.D., F.R.C.P. Second Edition. 8vo. pp. 86. Churchill. 1881.

WE do not wonder at this little book having so soon reached a second edition. It is one which ought to be in every practitioner's hands, dealing as it does briefly but clearly with an important though too much ignored department of medicine. It embodies the best and latest knowledge on the subject, and contains some good illustrations of important points.

We are glad to find that the author has modified some of his views upon "tendon-reflex" in accordance with the experimental criticisms of various observers. Perhaps the subject is somewhat too fully treated in a book intended as a practical guide. With reference to his new term "myotatic contractions," we agree with him that such a term is desirable, since the phenomena it is intended to designate are not reflexes. But the very great uncertainty of the Greek etymology he ascribes to it makes us doubt of its acceptance.

The Surgery of Deformities. By E. Noble Smith, F.R.C.S. Ed.
London: Smith, Elder, and Co. 1882.

We are, on the whole, very favourably impressed with this work. The writer has evidently studied his subject carefully, both in its literature and its practice. His style is clear, correct, and easy; and, as we should expect from the author (jointly with Dr. Klein) of the *Atlas of Histology*, his illustrations are, for the most part, artistic and effective. The opening chapter presents a convenient summary of the causes of deformities, and includes an interesting section contributed by Dr. Allan Sturge on abnormal muscular contractions, with a concise account of the diseases of the brain and spinal cord on which they depend. In the chapter on club-foot, although the author has introduced many references to the views of other surgeons, he has been able in moderate compass and without losing the thread of his own description to furnish us with what is, in the main, a trustworthy guide to treatment. We differ from him, however, as to the after-treatment of tenotomy. If a splint is left, as he directs (p. 56), "untouched for four, five, or six days," pressure-sores are very likely to form, especially in children; and it is not enough in the subsequent treatment of varus, to remove the splint (p. 69) every second or third day. A splint applied on Monday is loose on Tuesday, and if it is left till Wednesday or Thursday, not only may the skin be rubbed and become sore, but intermittent is substituted for continuous extension. The only safe rule is that the splint is to be re-applied, *de die in diem,* till the normal position is restored. Neglect of this rule is a common cause of failure. The chapters on lateral curvature and on caries of the spine are full, judicious, and up to present knowledge. In other parts of the volume the author has less practical information at his command, and runs into statements which are so general and superficial that they are useless. Thus he has done with that very difficult question, the treatment of deformities resulting from cicatrices, in less than three pages, and has nothing more definite to say as to appliances than that their form must vary with every case, and that the ingenuity of the surgeon will often be taxed in their contrivance. No ghost need come from the grave to tell us that. Again, after devoting ten lines (p. 106) to the symptoms of congenital dislocation of the hip, he informs us that "an appliance similar in principle to that recommended for hip-joint disease should be employed with modifications according to the peculiar circumstances of the case"—a statement that leaves us not much wiser than it found us. With increased experience in some branches of his subject which he has not yet cultivated by independent observation we have no doubt that the author, in his next edition, will be able to correct the deficiencies of which we have given examples, and so make his book a still more serviceable guide to this department of surgery.

Clinical Lectures on Diseases of the Heart and Aorta. By G. W. Balfour, M.D., F.R.C.P.E., P.R.S.E. Second Edition. 8vo. pp. 469. London: Churchill. 1882.

The first edition of Dr. Balfour's lectures has become well and favourably known among practitioners for their directness and vividness, as well as for their independence and originality. Almost all that they contained admitted of ready application to practice. Treatment was not made secondary, and the subtleties of diagnosis primary. The new edition has all these advantages, but it has been almost entirely re-written, and in the process has gained in clearness and minuter accuracy. The author discusses at sufficient length the indications for the use of digitalis and of iodide of potassium. In the case of the former he thinks the difficulty of diagnosing a fatty heart and the rarity of its rupture by its own contraction are enough to remove the last scruples to the use of the drug where degeneration is only suspected. He goes still further, and against the experience of most physicians uses digitalis freely in aortic regurgitation. In a few points such as these he is inclined to set at nought the best theories of the time, falling back on the argument of successful practice. In general, however, his rules are not merely empirically good, but they take also into account the results of modern pharmacology. The gain therefrom in lucidity and intelligibility is marked.

We commend to those who have to encounter objectors to the progress of scientific medicine the following note (p. vi.) There are people whose case it will meet admirably:—

"Though I myself never performed an experiment upon a living animal, and though I deprecate as much as any one the undue multiplication of such experiments, I yet hold it to be true that much that is now plain in cardiac diagnosis and definite in the treatment of cardiac disease, has been made so by means of experimental physiology, and that many patients now living owe their lives primarily to this method of investigation, which, kept within due bounds, cannot be regarded as inconsistent with Christian humanity, when we reflect that to save one life alone a whole herd of swine were sent into the depths of the sea of Gennesareth, and that we are also told 'Ye are of more value than many sparrows,' or frogs either."

On the Treatment of Cancer. By JOHN CLAY. 8vo. pp. 35. London: Churchill. 1882.

PROFESSOR CLAY here reprints the papers he has contributed within the last two years to the *Lancet* on the treatment of cancer, especially of the female generative organs, with Chian turpentine. They contain directions for making sure that the drug so called is genuine—by no means an easy task (*Practitioner*, xxv. 46). As to the success of the treatment Prof. Clay is modest. He merely claims as the outcome of his experience that "the remedy is far from being useless," and that it has "some ameliorating influence on cancerous disease." This absence of distorting enthusiasm bodes well for the ultimate attainment of true knowledge on a deeply important question.

The Physical Signs of Pulmonary Disease, for the Use of Medical Students. By GRAHAM STEELL, M.D., Resident Med. Officer, Manchester Royal Infirmary. Post 8vo. pp. 92. Edinburgh: Maclachlan and Stewart. 1882.

AN admirably clear and concise statement of what a clinical student should know in the matter of pulmonary physical diagnosis. It is small enough to be carried easily in his pocket. It is so well arranged that reference is a pleasure. It is so far "rational," that is, reasoned, that in mastering it the intelligence rather than the memory is exercised.

Clinic of the Month.

A Parasitic Affection of the Prepuce in Diabetic Patients.—The late Professor Oscar Simon, in a paper read before the Section for Diseases of the Skin at the meeting of the International Medical Congress, describes a peculiar inflammatory affection of the prepuce which occasionally occurs in diabetic patients. The inflammation is caused by the growth of a fungus, which finds its soil in the mixture of sebum and diabetic urine retained in the preputial fold. The fungoid growth is found, under the microscope, to consist of mycelium and spores in great profusion, and in all stages of development. Organs of fructification have not been found. The inflammation may be so intense as to cause phimosis. As a prophylactic measure diabetic patients are advised to clean the preputial sac thoroughly after micturition, and to use a disinfecting powder. Professor Simon gave the following formula:—

Oxide of zinc,
Amylum, of each twenty-five parts;
Salicylic acid, one part.

Professor Simon drew attention to the fact that sometimes the above disease is the only symptom the diabetic patient complains of, and is in itself sufficient to diagnose diabetes, for the parasitic balano-posthitis (or balano-posthomykosis) is limited to diabetic individuals. (*London Medical Record*, Aug. 1881.)

Diabetes Insipidus Treated with Ergot.—A good deal of experience has already been published tending to show that ergot has a very well-marked power in this often intractable form of disease. We give another instance of its successful use by way of recalling attention to the question. Dr. John Macaulay and Mr. Samuel Macaulay report the following case:—Mr. W. A. C., aged forty, came under our care in the beginning of December last, complaining of headache and disordered digestion, which were abundantly demonstrated by the appearance of his tongue, as it was covered with a creamy fur. He stated that for a short period prior to consulting us he had suffered from inordinate thirst and urination. His pulse was rather rapid the first time we saw him, but it was afterwards quiet. His family history was excellent, and he himself had enjoyed good health until about two years ago, when he suffered from an acute attack of Bright's disease. On examination his urine was found to be pale, of acid reaction, specific gravity 1002, and containing traces of albumen, but no sugar. He was ordered stomachic medicines at first, which had the effect of improving the condition of his digestive organs; then he was placed upon iron and quinine for some three weeks, but with no amendment of the diabetic symptoms. As he was passing enormous quantities of urine—generally from eight to ten quarts per diem—and was consequently losing flesh, we determined to try the effects of ergot, which remedy has been so successful in the hands of Dr. J. M. Da Costa, of Philadelphia, in the treatment of diabetes insipidus. Accordingly he was prescribed drachm doses of the liquid extract of ergot three times a day, on January 3. There was no change observed in his condition until the 7th of the same month, when slight diminution of thirst and diuresis took place, and, at the same time, the slight pain which he had complained of in his head now became so very severe that it was necessary to discontinue the administration of the ergot. In the course of a day or two the pain in his head had considerably abated, but the thirst and urination again increased. The ergot treatment was resumed on the 12th of January, in similar doses, and on the 23rd the intense thirst and excessive urination suddenly gave way to the normal condition of things in these respects; but again at this time he complained of the most excruciating pain in his head, which was relieved by withdrawing the ergot and giving a hypodermic injection of morphia. Since then there has been no return of the urgent thirst and diuresis; but the pain in the head is subject to periodic exacerbations and remissions, and is neuralgic in its character. We have no doubt that it will be at least temporarily relieved.

Remarks.—The above, although an undoubted case of diabetes insipidus, was complicated with Bright's disease, and this fact rendered the result of the exhibition of ergot a matter of considerable doubt, but the satisfactory effect produced has fully justified the experiment. There was no slowing of either the pulse or breathing produced in this case by the administration of ergot. There can be no doubt, from the results in the cases of diabetes insipidus which have been recently treated with ergot, that it is a remedy which has a powerful control over this most obstinate disease; and, if it can be proved to be an unfailing remedy for it in the future, then one more ailment will have been rescued from the category of "hopeless" diseases.—(*Lancet*, April 29, 1882.) [As the severe head-pain produced by the ergot is probably of ischæmic origin, nitrite of amyl would seem to be physiologically indicated for its relief.]

The Physiognomy of Phthisis.—Mr. Francis Galton has recently, in conjunction with Dr. Mahomed, been engaged in applying his method of "composite portraiture" to the investigation of the amount of truth which may underlie the popular belief that a certain type of features indicates a tendency to certain diseases or classes of disease. As yet their attention has been limited to the determination of the reality of a consumptive type, and for this purpose they have photographed a large number of patients, whom they then proceeded to group on clinical data. Cases of advanced disease showed nothing particular beyond well-marked emaciation. Cases grouped according to the rapidity of the course of the disease gave negative results, nor had those in whom the hereditary tendency was strongest anything very definite in common. But on a further examination these last were found to fall into two main divisions, not, however, separated by any well-marked line of demarcation. In the first division the faces were broad, with coarse, blunt, and thickened features; while in the second the faces were thin, narrow, and ovoid, with thin, soft, and narrow features—the two types corresponding with what are commonly known as the strumous and tubercular physiognomies. Comparing, however, phthisical and non-phthisical patients, they found the same proportion of narrow, ovoid faces to exist in each. Thus far their conclusions are opposed to the belief that any single type of face prevails among "consumptive" persons generally, or that persons of any special type are more predisposed to phthisis, although the phthisical members of each class are generally of a more delicate type, with finer features, lighter lower jaws, and narrower faces. Yet the delicate features and ovoid face seem to betray an excessively developed nervous temperament, with a deficiency of bone and muscle and staying power, easily breaking down under insanitary conditions or mental strain which their robuster brethren would resist; and if, as many maintain, the so-called strumous diathesis be a modified syphilitic taint, it is not surprising that among such, the low inflammatory changes called struma should be frequently observed. The inquiry, or rather the method employed, is new, and is certainly very interesting. (*Med. Times and Gazette.*)

Reduplication of the Heart-sounds.—Dr. D'Espine has examined with the cardiograph a number of clinical patients in whom the heart-sounds were modified in various ways. He finds that reduplication of the first sound depends on the contraction of the ventricular region in two separate segments, but never on successive contraction of the two ventricles. Increased tension in the aorta seems to be an essential condition of the phenomenon of reduplication, but it is not by itself sufficient to produce the phenomenon. On the other hand, reduplication of the second sound is determined by the failure of the aortic and pulmonary sigmoid valves to close simultaneously. Double diastolic impulse occurs in two diseases:—(1.) In aortic insufficiency with great regurgitation; it is then a bad symptom. (2.) In mitral insufficiency with stenosis and hypertrophy of the left auricle; it then depends on a secondary wave starting from the auricle, and is really a kind of premature præsystolic effect. (*Révue de Méd.*, Nos. 1, 2; 1882.)

Diet in Chronic Nephritis—Prof. Lichtheim, in an address to the Medico-Chirurgical Society of Berne, treats this subject with much fulness. The ordinary practice, he says, is to prescribe a diet more than usually rich in albumen with a view to replacing the loss from the kidneys. The patient's danger from loss of albumen is, however, much less than that arising from the imperfect filtration performed by the kidneys, and the consequent retention of nitrogenous waste-products in the blood. For a considerable time this tendency to retention may be counteracted by the increased blood-pressure and cardiac hypertrophy, which effects a sufficient elimination even from the defective kidneys. This being the case, it must needs be unwise to strain this attempted compensation unduly by giving nitrogenous foods in quantity; this merely implies increased production of nitrogenous waste and increased work on the eliminating organs. The result of such a regimen must be a further increase of blood-pressure and greater cardiac hypertrophy, until at last the heart ceases to respond and becomes dilated; in other words, a new difficulty to the embarrassed circulation is raised. By giving food which contained little nitrogen the professor has found that the dyspnœa of confirmed nephritics rapidly disappeared. He is inclined to regard this dyspnœa not as uræmic, but as a simple consequence of insufficient contraction of the heart, analogous, therefore, to the dyspnœa of cardiac patients. (*Correspond.-bl. für Schweiz. Aerzte*, No. 7, 1882.)

Ether-inhalations in Angina Faucium.—Prof. Concato, of Bologna, has, for the last year or so, been accustomed to administer ether-spray as an inhalation in sore-throat. His method is simple. The patient takes the exit-tube of a Richardson's spray-producer in his mouth; sulphuric ether is sprayed against the pharynx for three minutes, and the treatment is repeated every three hours. Six cases so treated were cured without other means. The cases are all described as "anginas," of what variety is not quite clear. Each case, however, began with a rigor and a sharp attack of fever, with a temperature of 40° C. (104° F.). Swelling of the sub-maxillary glands in nearly all the cases, and pain and difficulty of swallowing in all of them, were noted. The tonsils were always swollen and protruding. One of the patients, a girl of 11, had scarlatina succeeding to the angina. Another patient, whose attack of sore-throat lasted eleven days, and was very severe, had enlarged spleen. Four or five days was the average duration of the attack; one patient, however, attended by Prof. Concato at home, got well in twelve hours. It is set down as an advantage of the ether treatment that it very speedily puts an end to the local pain and diminishes the swelling, and so quickly restores the power of easy swallowing. In some cases the fever quickly subsided at the same time. The treatment is worthy of further trial. (*Rivista clin. di Bologna*, No. 3, 1882.)

Hydrophobia Successfully Treated with Pilocarpin.—Dr. Denis-Dumont communicated to the Paris Academy, on the 13th June, a report of a case of hydrophobia which he had treated and cured in the Caen Hospital. The patient, aged 38, had been bitten on the 16th April by a mad dog which had bitten two other persons also. One of these died with all the symptoms of rabies on the 20th May. On hearing of this Dr. Dumont's patient became excited, was seized with intense thirst and pharyngeal spasms, and tried to bite those who came near him. He was placed by himself in a room of the hospital and became restless and dejected. He was seized from time to time with convulsive spasms and uttered hoarse cries. Though he demanded drink he rejected it spasmodically as soon as he got it into his mouth. Morphia was injected subcutaneously, and enemata containing a drachm and a half of bromide of potassium administered. At this stage the bite-wound reopened. He complained of violent pains in his throat, and begged the bystanders to kill him Some time afterwards recourse was had to hypodermic injections of nitrate of pilocarpin thrice a day, whereupon calm was gradually restored and the man was ultimately discharged perfectly well. (*Progrès Méd.*, June 17, 1882.)

Treatment of Ascarides Lumbricoides.—Dr. Guermonprez sums up a long article on lumbricoides thus :—(1.) Worm-seed (whose action is not to be confused with that of santonin) is by far the best medicament for killing as well as expelling round-worms. (2.) Santonin does not kill the worms outright, it excites them to livelier movements, and these may reflexly stimulate the intestine so as to expel them; but they may also only exaggerate the evil if there is obstruction. (3.) Santonin is, therefore, by no means always to be chosen. It does no harm if the worms are young and not numerous; if they are mature and many it may be dangerous even in reasonable doses. (4.) The purgatives usually given with vermifuges probably do more than the latter to cause expulsion of the worms; simple evacuants will often suffice. (5.) Ordinary hygienic means directed to overcoming the lymphatic cachexia of the patient, or simple change of food and abode, may at times be enough to rid him of the worms without any medicine whatever. (6.) Hence our treatment should not be the mere routine administration of santonin, but should be determined by the circumstances of the case. Change of air, and of diet, and simple evacuation, are not to be forgotten. (*Bulletin Gén. de Thérap.*, p. 89, 1882.)

The Administration of Chloroform.—The *Gazette des Hôpitaux*, April 22, at the end of the *résumé* of the prolonged discussion on this subject, which has just terminated at the Académie de Médecine, gives the following account of the rules of procedure observed by a *collaborateur* who has been much employed, with constant success, in the administration of chloroform during the last ten years:—(1.) The compress is to be preferred to all other means; a handkerchief is to be had everywhere, and alarms the patient less than anything else. (2.) Fold the handkerchief into the form of the mouth of a horn, and keep it closely pressed against the point of the nose; but only pour the chloroform on the part of it which is not directly in contact with the skin. (3.) Its application should be intermitted, but this need not be done in the precisely regulated manner recommended by Professor Gosselin. (4.) Give very little chloroform at the commencement, in order to accustom the patient to it and prepare him for the feeling of suffocation. Then, when the first inspirations are over, pour on the chloroform very often, otherwise much time will be lost and complete anæsthesia obtained only with difficulty. (5.) Before commencing the application take care that no article of dress constricts the patient, removing even the string of a cap. (6.) Expose the epigastrium, and from the very commencement keep the eye on it and *constantly* watch the respiration without caring about the pulse. (7.) Always have a forceps within reach. (8.) As soon as the respiration becomes noisy and stertorous, remove the compress and allow the patient to breathe fresh air for a time. (9.) When respiration is arrested, seize the tongue with the forceps and draw it out, and immediately commence artificial respiration. If the respiration is not re-established after a few seconds, place the head low, forcibly flagellate the cheeks, keep the tongue out, and continue the artificial respiration for five, ten, fifteen, or even twenty minutes, if necessary. (10.) When the respiration is noisy, pass into the back of the throat a sponge mounted on a forceps, in order to remove the mucosities existing there—as they frequently do in patients suffering from colds. (11.) There is but one contra-indication to the employment of chloroform, viz., advanced phthisis. Affections of the heart are not contra-indications. (12.) Hysterical subjects should be distrusted. (13.) Alcoholic subjects are very tedious and difficult to bring under the influence of chloroform, but they are not dangerous. (*Med. Times*, May 13, 1882.)

Application of Chlorate of Potash to Epithelioma.—It does not seem to be generally known that excellent results have been obtained from the application of powdered chlorate of potash to epithelioma. The surface of the ulcer should be well cleansed, and finely-powdered chlorate thickly dusted on it, and allowed to remain until the next dressing. The application may be made twice a day, the surface being cleansed before each application. This treatment is said to relieve the pain, to change the character of the morbid process, and to promote healing. The same powder may be used in cancroid, chancre, and unhealthy ulcerations generally; and it has the merit of safety. (*Phil. Med. News*, April 8, 1882.) [See, however, *Pract.* xxv. 378.]

Chloroform-Water.—In an article in the *Gazette des Hôpitaux*, of March 25, attention is drawn to this highly useful preparation of chloroform for internal use. Professors Lasègue and Regnauld have shown that the solubility of chloroform in water does not exceed 9 per 1,000. The solution is obtained by pouring an excess of chloroform into a bottle three parts full of distilled water, shaking the mixture repeatedly, and then allowing the insoluble chloroform to deposit until complete transparency is obtained. The separation of the saturated solution is then made by decantation, or by means of a syphon. This solution, being too strong for internal use, requires dilution. (The *Aqua chloroformi* of the British Pharmacopœia has a nominal strength of 1 in 200.) Various salts (as chlorate of potash, borate, bicarbonate, and salicylate of soda) may be dissolved in this water without undergoing any modification; and Professors Lasègue and Regnauld are of opinion that chloroform-water, either pure or diluted, will meet every need in the internal administration of this substance. Having a pleasant taste in the mouth which lasts for a minute or two, it is well calculated to disguise the unpleasant taste of various medicines, as castor-oil, &c. By the direct action which it exerts on the mucous membranes, it may prove useful in certain affections of the mouth, gums, teeth, velum, and pharynx. It exerts a stimulant action on the stomach, but it acts differently according as it is taken before, during, or after a meal, and according to the lapse of time that has intervened between taking the meal and the absorption of the chloroform. Given before a repast, in aid of the appetite, the chloroform-water is a bad agent; but given after a meal, whether alone or combined with an alcoholic wine and sweetened, it increases the stimulant properties of the wine or produces like effects. When administered to allay the manifold troubles which supervene during the course of digestion and produce its disturbance it has much value. Its maximum therapeutic action is obtained three or four hours after the meal, when functional disturbances show themselves by yawning, distension, gaseous eructations, a sense of epigastric pressure or heaviness, flushings of the face, and threatenings of vertigo. But when the digestive disturbances are manifested by acute lancinating pains of the stomach, oppression, palpitations of the heart, fleeting febrile action, dryness of the mouth, painful tympanites, &c., the action of the chloroform-water is injurious; this stage contra-indicates all forms of stimulants. In a word, the chloroform-water acts on the stomach in the same calming way as upon the interior of the mouth, and if it does not cure the affection, at least it mitigates its consequences. It is a remedy for the crisis, but does not render needless the proper treatment-in-chief. It is eminently suitable in painful digestion arising from dilatation of the stomach.

Congenital Intestinal Obstruction.—Mr. A. Pearce Gould relates a case of congenital intestinal obstruction. A. B., a female, aged three days, was brought to Westminster Hospital on August 5, 1881, because, in spite of several doses of castor-oil, it had not passed any meconium or motion. It had vomited several times. The child was thin, but showed no outward deformity. The anus was normal, and the last joint of the little finger could be passed into the rectum, which appeared to be closed over above it. No fulness or tumour to be felt in the pelvis, per rectum. A catheter and probe were each stopped about one inch from anus. Belly distended, its walls œdematous; a little ascites. At 1 A.M., August 6, Mr. Gould opened the belly above left Poupart's ligament. A coil of distended small intestine presented, and no coil of large intestine could be brought into the wound. So the former was carefully stitched to the edges of the incision and then opened, and a large quantity of meconium escaped. The child died twenty-one hours afterwards. At the autopsy no trace of peritonitis was found. The cæcum and lower four inches of ileum, and four inches of colon, were filled with a firm, whitish substance of the consistence of cheese, firmly applied to, but not united with, the mucous membrane. In the colon beyond this plug were found several masses of milk-white, firm mucus. Below this the colon and rectum were empty, and firmly contracted to the size of a clay tobacco-pipe stem. Above it the small intestine was distended with meconium and gas. It was pointed out that there was here no fault in development, but obstruction from a plug. From the white colour of this plug it was assumed that it was deposited by the third month of fœtal life, as bile passes into the duodenum at that time. Three cases of congenital obstruction of the small intestine, briefly referred to by Mr. Holmes, were mentioned, and also the case of obstruction from a croupous membrane, recorded in the *Clinical Society's Transactions* by Dr. Markham Skerritt. Mr. Gould also insisted on the advantage of opening the belly in the groin in all cases of congenital intestinal obstruction, in preference to lumbar colotomy, which would have been impossible in this case. Dr. Coupland asked if the obstructing mass was formed of inspissated mucus. The case was almost unique. If the substance were inspissated mucus, it showed that in that case the glands of the large intestine must be acting some time before birth. Mr. Gould replied that the matter was undoubtedly inspissated mucus. (*Clin. Society,* April 28, 1882.)

Extracts from British and Foreign Journals.

The Sixteen Commandments of the Paris Academy of Medicine.—The Paris Academy of Medicine has condensed into the following sixteen propositions the most important hygienic rules for the care and management of infants.

I. During the *first year* the only suitable nourishment for an infant is its own mother's milk, or that of a healthy wet-nurse. Suckling should be repeated every *two* hours—*less* frequently at night.

II. When it is impossible to give breast-milk, either from the mother or a suitable nurse, cow's or goat's milk given tepid, reduced at first one-half by the addition of water slightly sweetened, and after a few weeks one-fourth only, is the next best substitute.

III. In giving milk to an infant always use glass or earthenware vessels, not metallic ones, and always observe the most scrupulous cleanliness in their management, rinsing whenever used. Always avoid teats of cloth or sponge, so frequently used to appease hunger or quiet crying.

IV. Avoid carefully all those nostrums and compounds so liberally advertised as superior to natural food.

V. Never forget that artificial nourishment, whether by *nursing bottle* or *spoon* (without the breast), increases to an alarming degree the chances of producing sickness and death.

VI. It is always dangerous (especially during the first two months of its life) to give an infant solid food of any kind—such as bread, cakes, meats, vegetables or fruit.

VII. Only after the *seventh* month, and when the mother's milk is not sufficient to nourish the child, should *broths* be allowed. After the first year is ended, then it is appropriate to give light broths or paps, made with milk and bread, dried flour, rice, and farinaceous articles, to prepare for weaning. A child ought not to be weaned until it has cut its first twelve or thirteen teeth, and then only when in perfect health.

VIII. An infant should be washed and dressed every morning before being nursed or fed. In bathing a child, temper the water to the weather, carefully cleanse the body, and especially the genital organs which require great cleanliness and care; the head should be carefully freed from all scabs and crusts which may form. Where the belly-band is used it should be kept on for at least one month.

IX. An infant's clothing should always be so arranged as to leave the limbs freedom of motion, and not to compress any portion of the body.

X. An infant's clothing should be studiously adapted to the weather, avoiding at all times exposure to the injurious effects of sudden changes in the temperature without proper covering; but nurseries and sleeping apartments should invariably be well ventilated.

XI. An infant should not be taken into the open air before the fifteenth day after birth, and then only in mild, fair weather.

XII. It is objectionable to have an infant sleep in the same bed either with its mother or nurse.

XIII. No mother should be in too great a hurry to have a child walk; let it crawl and accustom itself to rising on its feet by climbing on articles of furniture, or assisted by the arms of a careful attendant. Great care should be taken not to use baby-carriages, &c. too early.

XIV. No trifling ailments in infants, such as colics, frequent vomiting, diarrhœa, coughs, &c., if persistent, should be neglected—a physician's advice should be at once obtained.

XV. In cases of suspected pregnancy, either of mother or nurse, the child should be weaned at once.

XVI. A child ought to be vaccinated after the fifth month, or earlier should small-pox be prevalent. (*New Orleans Surg. and Med. Journ.*, Feb. 1882.) [*Pract.* xxvi. 454.]

Pityriasis and its Parasite.—M. Vidal gives a *résumé* of his observations on the affection of the skin described by him under this name. The eruption begins by small rose-coloured spots, scarcely raised above the level of the skin. Their surface is dry and slightly scaly. The spots are irregularly distributed, usually beginning on the trunk, but occasionally extending to the arms and thighs. They extend slowly. M. Vidal believes that he has discovered a special parasite in this affection, consisting of very minute spores, averaging a thousandth of a millimetre in diameter. The extreme smallness of the spores and their irregularity in size has induced M. Vidal to name the parasite *Microsporon anomœon* or *dispar.* (*Annales de dermatologie et de syphiligraphie,* Vol. III., No. 1.)

Mango as a Remedy.—The mango, *Magnifera Indica,* has recently been introduced into America as a therapeutic agent, in the form of a fluid extract made either from the fruit or the rind. The Indians have long employed the leaves and petioles as masticatories to give tone to the gums, whilst the Hindoos use the rind in skin affections. A soft reddish-brown gum resin which hardens when kept and resembles bdellium is obtained by incising the rind of the mango. The resin is entirely soluble in alcohol, and partially so in water, forming a kind of milky emulsion : mastication softens it, when it sticks to the teeth and leaves a pleasant but slightly bitter taste. Mango also appears to be an astringent with a special tonic action upon the mucous membranes. Its effect is great in diphtheria and other malignant throat diseases, when the fluid extract is applied locally, as well as in the form of a gargle, in the proportion of 10 grammes of the extract to 125 grammes of water.—In hæmorrhages from the uterus, intestines and bronchi, and in muco-purulent discharges from the intestines and uterus, Dr. Linquist its introducer knows of no equal. The advantages of the remedy are that it can be given in a small dose; that it is easily taken as it has a pleasant taste; that it causes no derangement of the stomach; that it acts rapidly; and that it is more certain in its effects than other agents. The following formula is recommended as a serviceable one :—

℞. Fluid extract of mangifera indica, 10 grammes.
Distilled water, 120 grammes.

Mix without filtering. A teaspoonful every hour or two. (*Journ. de Méd. de Paris,* Nov. 12, 1881.)

Improved Method of treating Carbuncle.—Dr. Charles Taylor calls attention, in the *Australasian Medical Gazette*, to the use of injections of strong carbolic acid into the substance of the carbuncle, as a very efficient means of causing it either to "abort" or run a much shorter course than usual. He has employed this method with success in a number of cases where carbuncle occurred in persons "enjoying good bodily health." An ordinary hypodermic syringe is used, and five or six drops of pure fluid carbolic acid injected. Linseed-meal poultices, fomentations, and constitutional remedies, such as the individual case may suggest, are also resorted to. There is little or no pain manifested on the part of the patient, and the acid seems to be retained where most needed, in the substance of the tumour, by coagulating the albumen in the surrounding tissues, and thus preventing absorption into the system. Dr. Taylor's method, as he himself states, is by no means original, but is a modification of two other methods, that of Dr. Eader, who introduced threads saturated with a solution of carbolic acid in glycerin, and that of an American practitioner whose name he fails to mention, who injected half a drachm instead of five or six drops of the pure acid. (*Philad. Med. Times*, Feb. 25, 1882.)

Treatment of Bubo with Carbolic Acid.—Dr. Morse Taylor, U.S. Army, in a paper on the abortive treatment of bubo by the injection of carbolic acid, reports twenty cases in which he certainly obtained remarkably successful results. He states that within the last seven years he has treated nearly 150 cases of various forms of lymphadenitis arising from specific and non-specific causes, and when he saw them before the formation of pus was well established he never failed to arrest the process immediately and allay pains in a few minutes. His method is to inject from ten to forty minims of a solution containing eight or ten grains to the ounce directly into the tissue of the inflamed gland. (*Amer. Journal of Med. Sciences*, April, 1882.)

The Action of Calomel on Fermentation and on the Life of Micro-organisms.—A paper with this heading appears in the last number of Hoppe-Seyler's *Zeitschrift für Physiologische Chemie*, by N. P. Wassilieff, who, after noting the high estimation in which calomel has been always held in disordered conditions of the bowels, especially in children, points out the absence, with one or two exceptions, of any experiments to show or explain the cause of its influence. Voit, indeed, as long ago as 1857, observed that albumen and blood mingled with calomel were capable of being kept for days without any indication of putrefaction, and Hoppe-Seyler made some similar observations; but besides these, few, if any, researches have been made on its action. In M. Wassilieff's experiments, calomel was added to the fluid obtained by acting on albumen with gastric juice, and to that obtained by acting on albumen with pancreatic juice; and he satisfied himself that the albumen-digesting ferment of both these fluids was not damaged by calomel—peptones in the one instance, and leucin and tyrosin in the other, appearing as usual: —but that the presence of this substance prevented the formation of the secondary products, such as indol and phenol. Neither hydrogen nor hydrogen sulphide formed in the fluids containing calomel, whilst they were abundantly produced in the others. In like manner, the author experimented on the effects of calomel on the fat-digesting and the amylolytic ferments of the pancreas, and found that it had no modifying influence upon them, but that it arrested the changes which followed their completion, entirely preventing, for example, the butyric acid fermentation and putrefactive processes. He hence arrives at the conclusion that calomel acts differently on the formed or organised and the unformed or unorganised ferments, permitting the action of the former to proceed unchecked, but completely preventing the action of the latter. (*Lancet*, March 4, 1882.)

The Medicinal Value of Vegetables—A celebrated cookery-book discusses the medicinal value of vegetables, as follows :—" Asparagus is a strong diuretic, and forms part of the cure for rheumatic patients at such health-resorts as Aix-les-Bains. Sorrel is cooling, and forms the staple of that *soupe aux herbes* which a French lady will order for herself after a long and tiring journey. Carrots, as containing a quantity of sugar, are avoided by some people, while others complain of them as indigestible. With regard to the latter accusation, it may be remarked in passing, that it is the yellow core of the carrot that is difficult of digestion—the outer or red layer is tender enough. In Savoy, the peasants have recourse to an infusion of carrots as a specific for jaundice. The large sweet onion is very rich in those alkaline elements which counteract the poison of rheumatic gout. If slowly stewed in weak broth, and eaten with a little Nepaul pepper, it will be found to be an admirable article of diet for patients of studious and sedentary habits. The stalks of cauliflower have the same sort of value, only the stalk of a cauliflower is too often so ill-boiled and unpalatable that few persons would thank you for proposing to them to make part of their meal consist of so uninviting an article. Turnips in the same way are often thought to be indigestible, and better suited for cows and sheep than delicate people; but here the fault lies with the cook quite as much as with the root. The cook boils the turnip badly, and then pours some butter over it, and the eater of such a dish is sure to be the worse for it. Try some better way. What shall be said about our lettuces? The plant has a slight narcotic action, of which every French old woman, like every French doctor, well knows the value; when properly cooked it is really very easy of digestion." (*New York Med. Rec.* June 10, 1882.)

Alkaloids of Quebracho.—About three years ago Dr. Penzoldt recommended quebracho as a palliative in dyspnœa [*Practitioner* xxxiii. 284]. The composition of this bark has recently been investigated by O. Hesse, who has obtained from white quebracho bark six alkaloids : aspidospermine, aspidospermatine, aspidosamine, hypoquebrachine, quebrachine, and quebrachamine, and a neutral substance which he calls quebrachol. Dr. Penzoldt has investigated the actions of these substances, and finds that all the six alkaloids in doses of 0·01 to 0·2 gramme produce in frogs paralysis of the motor apparatus. The paralysis appears first in the respiratory muscles, and afterwards in the other muscles of the system, the sensibility remaining intact for a long while. The motor paralysis depends on central disturbances in the case of the four alkaloids aspidospermine, aspidospermatine, quebrachamine, and hypoquebrachine. In the paralysis produced by aspidosamine and quebrachine it appears as if an action similar to that of curare also came into play. It was found that the ligatured extremities remained entirely movable, or at least for a longer time than others. Further that the nerves of an unligatured limb were sometimes absolutely unexcitable and sometimes more weakly excitable than in the limb on the other side. Respecting the influence upon the heart (in frogs also) only quebrachine, aspidosamine, aspidospermatine, and aspidospermine were tested. The result was that all the substances quickly produced increasingly marked slackening and finally cessation of the heart-beats. With small rabbits quebrachine in doses of 0·02 to 0·04 gramme caused motor paralysis, strong injection of the vessels of the ear, and dyspnœa. Hypoquebrachine similarly produced difficulty in breathing and slight motor paralysis. Aspidospermine produced in larger doses (0·08 to 0·12 gramme) considerable dyspnœa and eventually indications of muscular paralysis. From aspidosamine and aspidospermatine in doses of 0·02 to 0·04 gramme no action of importance on the breathing or motor power was observed. Red quebracho bark contains tannic acid and two alkaloids only, one of which, loxopterygine, is stable, but the other is very easily decomposed. Hypoquebrachine closely resembles paytamine, an alkaloid from another species of *Aspidosperma.* The genus *Aspidosperma* is closely related to the genus *Strychnos*, and the bases obtained from both present a certain similarity in their reactions and physiological action. (*Pharm. Journ. and Trans.*, Nos. 613 and 614.)

Lemonade-Iron.—Professor Goodell of the Pennsylvania University has the following passage in a clinical lecture on vegetations of the endometrium delivered May 24, 1882.—"Gentlemen, we often have to be 'as wise as serpents and as harmless as doves' in our prescriptions. Now, I wish to see this patient again, but if I give her some bitter unpleasant medicine, she may get out of humour and not come back. Her appetite is not very keen, so I shall give her medicine which is very pleasant to take, and which I think will give her a very good opinion of me. This medicine is the lemonade-iron, after the following prescription

℞. Tincturæ Ferri Chloridi, ʒ iv,
Acidi Phosphorici diluti, ʒ vj,
Spiritus Limonis, ʒ ij,
Syrupum, ad ℥ vj.—M.
Sig. A dessertspoonful, in water, after meals.

I do not use the syrup of lemon in this prescription because it is sour, and there is enough of acid in the tincture of iron and phosphoric acid. I, therefore, add the simple syrup and spirits of lemon. If you wish to give the iron as a chloride, you cannot do so by this formula, for I believe the chloride of iron in this combination breaks up into phosphate of iron, while hydrochloric acid is set free." (*Phil. Med. News*, June 3, 1882.)

Ringworm of the Scalp.—Dr. Cavafy gives the following account of a method of treatment he has employed in this disorder for more than a year. "Thinking that the accumulation of sebaceous matter and epithelial débris in all probability prevents the penetration of remedies into the follicles, which are further blocked by the swollen diseased hairs, and that it should be our object to bring any parasiticide into contact with the most deeply-seated fungus, it occurred to me that we might attain this end by the employment of a parasiticide held in solution in a fluid which should also dissolve fatty matters. It certainly seemed to me desirable to exclude fatty and oleaginous materials from the remedy, and to apply this in solution, *i.e.* the minutest form of subdivision. Accordingly, I determined to employ a solution of boracic acid, twenty grains in an ounce of spirit, to which a drachm of ether was added; and directed this lotion to be forcibly rubbed into the affected parts of the scalp with a rag or moderately stiff brush three times daily, the whole head being ordered to be washed every morning with plenty of hot soap and water.

The result of this treatment in severe chronic uninflamed cases, is certainly excellent, when it is faithfully carried out. The frosted, scaly aspect of the diseased patches is soon replaced by healthy-looking scalp, the broken and twisted hairs appear to be removed, and a healthy growth makes its appearance. When the scalp is seen shortly after the application of the remedy, it is found to be shining, owing to the presence of a fine glaze. This, I presume, consists of dissolved sebaceous matter, mixed with boracic acid, deposited in a thin film after evaporation of the solvent, and for this reason I think its removal by soap and water is a necessary adjunct to the treatment. This would, perhaps, be best effected by alkaline spirit of soft soap, which, however, I have not used. Now, will this treatment suffice to cure chronic uninflamed ringworm? I should hesitate to say. I have certainly seen many cases in which the disease appears to have been entirely removed; but (there is always a "but" in the treatment of ringworm) I must admit the possibility of a diseased stump or two having remained. I find it an extremely difficult matter to be quite certain that every hair is healthy on a scalp which has once been affected with ringworm, and in this I believe my experience is not singular. I have had cases which seemed cured, brought back to me on a later occasion with distinct ringworm; and it is no doubt possible that this may have started afresh from an old, undetected, excessively minute focus. But, with our very imperfect means of observation of hospital out-patients, it seems equally possible that such cases may be due to reinfection, either from other children in the same family, or from a new source.

I may say, in conclusion, that Professor Kaposi (*Hautkrankheiten*, 2nd edit. p. 740) recommends, among other remedies, the application of alcoholic and ethereal solutions of carbolic and salicylic acids. These would, no doubt, do very well, but the entire absence of any irritation by the use of boracic acid seems to me in its favour, while its efficacy as a parasiticide is unquestionable. The remedy may be, no doubt, varied in different cases, but, if our object is that it should penetrate into the hair follicles, I certainly think that it should be employed in solution and forcibly rubbed in, and that the use of an oily or fatty vehicle is to be depreciated." (*Brit. Med. Journ.*, June 24, 1882.)

Ehrlich's Method of Staining Tubercle-Bacilli.—This method is a great improvement over Koch's original method, in that the bacilli are much more brilliantly stained and easily found; and it also takes a much shorter time, the whole process requiring only from half an hour to an hour. Ehrlich has employed it chiefly in the examination of sputa; and it has now been adopted by Dr. Koch, in preference of his own method. The sputum is spread in a thin layer on a cover-glass, and dried. In order to fix the albumen, the cover-glasses are kept at a temperature of 100° to 110° Cent. (212° to 230° Fahr.) for an hour; or, in practice, it is sufficient to pass them three or four times through a gas flame. The staining solution is prepared as follows.—About five cubic centimetres of pure aniline are added to 100 cubic centimetres of distilled water, well shaken, and then filtered through a moistened filter. To this mixture, a saturated alcoholic solution of fuchsine, methyl-violet, or gentian-violet, is added till precipitation commences. The cover-glass is allowed to float on this, with the side on which the sputum has been spread directed downwards, for a quarter to half an hour. It is then washed for a few seconds in a strong solution of nitric acid (one part of commercial nitric acid to two parts of distilled water), and afterwards in distilled water. In this way, the stain is extracted from everything but the tubercle-bacilli. The ground substance may be stained brown (if the bacilli have been stained violet), or blue (if the bacilli have been stained red), by way of contrast to the bacilli. It is interesting to hear that, in Berlin, the examination of sputum for these bacilli is now generally employed as a means of diagnosing tuberculous affections of the lung from others: for the bacilli are constantly present in the sputa in cases of tubercle. (*Brit. Med. Journ.*, June 17, 1882.)

Convallarine.—Professor Germain Sée has brought to the notice of the Academy of Medicine a new substance which promises to be of great therapeutic value. It is an alkaloid extracted from the *Convallaria majalis*, or the lily of the valley. This new alkaloid has been discovered by Dr. Hardy, an eminent chemist who also discovered the alkaloid from the jaborandi, to which he gave the name of "pilocarpine." Convallarine, the name of the new substance, has been experimented with by Professor Sée at the Hôtel Dieu, in conjunction with Dr. Hardy, of which hospital the latter is *chef du laboratoire*. Its therapeutic action is compared with that of digitalis, for which it may be with advantage substituted, as it has none of the inconveniences attributed to digitalis. Dr. Hardy was led to make researches with this plant from the fact of its being generally used by the peasants in Russia, who employ the herb in dropsies, and in all cases requiring increased diuresis. According to Professor Sée, the convallarine is a powerful diuretic, and it has a marked influence on the contraction of the heart, which it regulates, while it lowers the pulse in a remarkable manner. (*Lancet*, July 15, 1882.)

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Department of Public Health.

ON PREVENTIVE MEDICINE IN ITS RELATION TO THE GENERAL PRACTITIONER.

BY J. WILKIE BURMAN, M.D. EDIN., S. SC. CERT. CAMB.

Late Medical Superintendent, Wilts County Asylum, Devizes.

WITHOUT entering the wide domain of preventive medicine in its broadest sense, and in its general relations as regards masses of people and communities at large, it is possible, and might perhaps be profitable, to take a more limited survey of the subject as applicable to every-day practice. Whilst leaving preventable disease *in bulk* to be more properly dealt with by the special and skilled efforts of medical officers of health, it may yet be desirable to consider how far, and in what ways, such disease may be dealt with *in detail*, by the auxiliary efforts of the general practitioner.

It is obvious that in order to wage a successful war against preventable disease and preventable mortality, the intelligent assistance of the great bulk of general medical practitioners cannot be dispensed with, and it should be readily afforded in every possible way. The removal of the *cause* (or the prevention of its operation as far as possible) being the first principle in the prevention and treatment of disease, it is evident that the best facilities, with regard to this, must always rest in the hands of the general practitioner, who is well acquainted with the family history of each individual patient, and who not only observes disease when most amenable to treatment, viz., at its *outset*, but is often enabled to observe its insidious approach, and is thus in a position to prevent its development by timely warning and attention. The general practitioner cannot, however, satisfactorily fulfil his desirable functions in this respect without the willing and active co-operation of his patients or clients, who, doubtless, as the laws of nature regulating health become more widely known and appreciated, will gradually awaken to a just sense of the importance of endeavouring to secure to themselves an immunity from preventable disease, as far as that be possible, by means of prevenient attention and provident arrangements. It is not at all impossible that long before our "Hygeias" are all built, and a more or less Utopian standard of health generally attained by the conversion of England into "Salutland," the *forestalling* of disease, or at least the *throttling* of it (so to speak) at its very outset, will be shown by experience to be at once more desirable and less costly than the mere cure or amelioration of it after it has developed itself and taken firm root in the system.

Whilst much is now being done, much, I am afraid, remains yet to be accomplished in the way of educating the masses of the people, with a view to securing their intelligent co-operation with us in endeavouring to ward off preventable diseases, defer death, and lessen the mortality arising from causes and conditions which it is beyond our power to prevent.

It is only reasonable to suppose that when our patients shall be rendered fully alive to the dangers to health that beset them, and clearly understand how far, and in what ways, much disease and misery may be averted by simple precautions, and that when they are fully cognisant of the risks they expose themselves to in running contrary to the laws of nature regulating health, they will then wisely hasten to afford us that co-operation which is so necessary and desirable, but which, unfortunately, at present, is too often wanting.

In order to render such education of our clients complete and universal, it is a question as to whether or not doctors of medicine, in every town, should be subsidised by the State, or in some other way induced to give regular popular lectures at stated periods, and thus fulfil, in reality, their true functions as *doctors* of medicine. It will be sufficient for our clients to be taught in some way or another to realise and understand simple *facts*, the *technique* and *practice* being left to those who have been fully educated in medicine and made it their profession. In the words of the well-known author of *A Code of Medical Ethics* (Dr. Styrap), "it is a noble, unselfish task to promote health and obviate disease by the judicious application of hygienic science, and by so prolonging life, to increase the productive industry, and thus, without assuming the function of moral and religious teaching, to advance the civilisation of the people." And again, that author states further on in his work, when discussing the duties of practitioners to the public that "it is the duty of the faculty to be ready to advise the public on subjects specially appertaining to their profession, such as public hygiene, legal medicine and medical police," as well as "their province to enlighten them with regard to drainage, water-supply, ventilation and sanitation generally, and in respect to measures for the prevention and mitigation of epidemic and contagious diseases." I have ventured to quote this eminent (and almost the only recognised) authority of recent times, on this subject, in order to show that there would be nothing contrary to medical ethics in the performance, by medical men, of such functions as those above described, but that it is rather a duty incumbent upon those of them who may be most competent for the purpose, whether endowed with the more or less honorary title of "Doctor" or not.

It may be suggested by some, that if we are to carry out a system of education of the public of this kind, which would be likely to result in the diminution, to a great extent, of the numerous preventable diseases, on the treatment and cure of which we so largely depend for our very livelihood at the present time, we should, by such excess of zeal, for worthy and self-denying purposes, be nevertheless "cutting our own throats" (so to speak). And it is no doubt true that if such an intelligent co-operation of client and medical adviser should be as successful in obtaining the objects in view as we might desire, a source of considerable income would no longer exist for us, that is to say, should we continue, as at present, to be called in only when disease has developed itself, with a view to curing it, or ameliorating the condition. But I believe that compensation for loss in one direction would be forthcoming in the shape of gain in another, for it is very likely that further enlightenment of the public in those matters, combined with a little gentle persuasion on our own part, would result in our clients entering into a provident arrangement with us, whereby, for a fixed annual sum, we should provide them with ordinary medical attendance, and assure them against an uncertain doctor's bill at any rate, and against disease as far as that be possible; and without extra charge, we should visit them regularly at stated periods, whether they be well or ill, and afford them the benefit of our advice at all times whenever sought for. Some such provident system in medical practice is highly desirable, and would be mutually beneficial: to the practitioner, by providing him with a certain and fixed income, and to the client, by giving him greater facilities than at present for timely consultation with the doctor, and by enabling him to know exactly what it will cost him annually for all necessary medical attention for himself and family. Surely as much provident care and attention is necessary and desirable for our clients as for our *pianos;* they, at least, are inspected at regular periods during the year, and kept in tune for a fixed sum. I have a very strong individual conviction in this respect, for I cannot see how preventable disease is to be successfully thwarted and averted in any other way, or how in any other way we could (as we ought to) be compensated for the losses we should incur, than by regular medical inspection, in any case, of our clients and their surroundings all the year round, and by affording them frequent and free opportunity to avail themselves of our special knowledge as their medical advisers, in all matters pertaining to the promotion of health and the prevention of disease.

With these preliminary remarks, then, let me now proceed to consider in what ways, with the co-operation of his patients or clients, the general practitioner and family medical adviser has scope afforded him for the further diminution of preventable disease.

The first question that naturally arises, is, how far it is possible, by judicious marriages, in accordance with the laws of health, to provide against the dissemination and propagation of those *hereditary* diseases which are unfortunately so commonly handed down and perpetuated by ill-assorted unions of the sexes: and also, to go a step further, how far it may be possible to improve the resulting progeny, and each succeeding generation, by a careful selection and combination of progenitors, as far as that may be feasible, where the sentiments and feelings very naturally so much predominate over cool reason and wise foresight. There is no doubt that much could be done in these respects if our clients could only be brought to consult their family medical adviser in all cases previous to the contraction of a marriage, and either forego alliances that might be condemned as inadvisable on hygienic grounds, or at any rate be duly warned of the consequences likely to ensue from injudicious unions contracted contrary to medical advice. And surely it is quite as important, that careful attention should be bestowed on this subject, in reference to the human species, as it is in reference to our *horses* and *cattle*, with regard to improving the breed of which we are so very particular and at the same time so successful. As to the careful selection of progenitors, that is as a rule duly provided for by the natural instinct implanted in both sexes, which, if not over-ridden by force of other circumstances, impels to mutual selection of what may appear to each to be the most beautiful and the most fit, either as to physical or mental qualifications. And there is not much to deplore in this respect, unless as regards *mariages de convenance*, and other unions not uncommonly contracted contrary to the instinct of natural selection for pecuniary and other motives; against such purely selfish transactions adverse medical advice would be least likely to prevail, if indeed it were sought for. The risks both to mother and child that are involved in the contraction of marriage by the female before the pelvis is fully developed, or after it has by lapse of years become more or less rigid and unyielding, cannot be too strongly and too widely inculcated, for through ignorance, or neglect of previous medical advice in this respect, there are many precious lives annually sacrificed which might be saved, and much misery thereby be prevented. It would seem to be advisable, with a view to greater success in the promotion of judicious marriages, that medical advice should be sought for by the intending candidates for matrimony *previous* to their becoming involved in and brought under the powerful influence of sentimental feelings, and when, being thus unfettered, they might calmly and with wise foresight acquaint themselves with certain points in family history, &c., that it is important to have a knowledge of before going further in the matter. At any rate it is easy to imagine in the case of a peerage, the extinction of which in a greater or less time, or its indefinite prolongation, might greatly depend on the likelihood or otherwise of the survival of issue, that previous medical advice duly sought for and acted upon might be of immense service, and should in such a case certainly always be resorted and adhered to.

The inadvisableness of consanguineous marriages is pretty generally known, and such unions, excepting under very special circumstances, are generally avoided; and, as we know, the disadvantages of breeding "in and in" are carefully guarded against in the case of the lower animals. Practically, however, there is no satisfactory evidence to show that in the human species such unions are very hurtful, unless there should be a taint of consumption, insanity, or other serious hereditary disease in either progenitor, in which case most probably (and undoubtedly if such taint should exist on both sides) there will be a direct propagation of disease that might have been otherwise prevented. In fact, under certain aggravated conditions of this kind, it is a serious question as to whether it should not be a *penal* offence to marry, *i.e.* if we are ever to be successful in preventing, to the greatest possible extent and in the only possible way, the transmission and spread of very fatal and hereditary diseases. Then with regard to syphilis, it is highly desirable, with a view to preventing the spread of that dire disease in this way, that medical advice should be sought for and acted upon, as to when, if at all, it may be safe to contract marriage under the circumstances: but with regard to this I feel sure that few of our clients would rashly commit themselves to the consequences that might ensue from neglect of medical advice beforehand. Much more might be said on this subject of judicious marriages, with a view to the prevention of disease in a very radical manner; but I shall not further dwell upon it here except to say, that whilst admitting there is much which, at the present time, is of a visionary and impossible nature in my remarks and suggestions with regard to it, yet nevertheless we should continue to advocate such precautions and restrictions to the best of our ability, as well as on every convenient opportunity to endeavour to inculcate amongst our clients that knowledge of facts and experience which forms the basis of our advocacy. I am convinced that our success in such delicate matters will be exactly in proportion to our ability to place the whole bearings of the case clearly before each individual, without seeking to enforce our views by mere dogmatical assertions. Adverse medical opinion, under such circumstances, could not fail of itself to be sufficiently unpalatable to require strong seasoning of full and convincing explanation, with a view to its being inwardly digested and favourably received.

Leaving the question as to marriage, we have next to consider how far a healthy progeny may be assured, and disease in the newly-born infant prevented by attention to the mother during the nine months or so at our disposal for that purpose. And here the great influence for good that may, under ordinary circumstances, be brought to bear upon the future progeny by the mother acting under medical advice, and by careful attention to frequently neglected hygienic rules, is self-evident and well known, and cannot be over-estimated. But how far the health of the progeny may be secured in the case of a diseased mother suffering from any such form of tangible disease as is apt to be transmitted to the infant during the period of intra-uterine existence, is a further development of this part of the question which requires special consideration. Is it possible, by medication and general medical treatment of the mother during pregnancy, besides benefiting the mother herself, to prevent the spread of such a palpable disease, as say syphilis for instance, from the mother to the child, and to secure a healthy progeny in such a case in spite of the disease of the mother? The intimate connection between the circulation of the mother and that of the fœtus is highly in favour of the supposition that by medication of the mother we can obtain the desired therapeutic effect upon the fœtus. Of course we cannot hope in this manner to influence the propagation of *tendencies* to hereditary disease, which are probably due to occult and ineradicable molecular or other derangements existing originally in the ovum itself, and destined to influence the general development of the child and modify unfavourably its general constitution in a manner beyond our control. I only here refer to *palpable* and *directly communicable* disease (such as above indicated), and not to transmissible *tendencies* to disease which may develop themselves in the progeny sooner or later after birth. I believe that much *may* be done in such cases by medication of the mother, and by proper hygienic attention and surroundings, and I believe that regularly in practice much disease in the unborn is prevented or cured in this way, and also that much more might probably be done in this respect if regular medical inspection and supervision at all times should become the rule.

Then passing on to the consideration of the preventable diseases of infancy and early life, what a field is there before us in which prevenient attention, under medical advice, would undoubtedly lead to a great diminution of disease and mortality. When we consider that the proportion of deaths of children under five years of age is more than forty per cent. of the total deaths in England and Wales (Dr. Letheby—"On the Estimation of Sanitary Condition," pp. 20, 21), and that no less than *one-half* of the human family perish *before the age of puberty*, and chiefly from causes brought into operation by man himself (Cameron, Manual of Hygiene), we may well, I think, feel appalled, and hasten to consider how far it may be possible to bring about a reduction in this excessive mortality, by combating the various preventable diseases to which it is largely due.

A considerable proportion of this mortality is of course due to the so-called zymotic diseases so peculiar to childhood, which, along with "other similar enemies of mankind," it would be even possible in this insular country to stamp out and abolish altogether, according to Sir Thomas Watson. In the work of this distinguished authority on this subject, published two or three years ago, he indicates as the requisite for bringing about this happy consummation, "(1) the unfailing and immediate notification to the proper authorities of the occurrence of every case; (2) the instant isolation of the sick person; (3) the thorough disinfection of his body, clothes, furniture, and place of isolation; and (4) vigilant and effectual measures to prevent the importation of disease from abroad, and to strangle it should it by mischance return." In these ways Sir Thomas Watson does not doubt that liberation from, and protection against, these diseases are possible. It is a matter that might well engage the serious consideration of the governing body in this country, who have given such assiduous and successful attention to the stamping out of zymotic disease in the lower animals—such as *rinderpest* in cattle. Not only have we to consider the "prodigious mass of premature deaths that might in this manner be prevented," but the "far greater, and indeed innumerable," multitude of those who, though not *killed* are nevertheless "wounded, maimed, disabled, and impoverished by the stroke of these dread diseases, which thus bring widespread ruin and misery upon whole families at once." The duties and powers of the general practitioner in the promotion of such a grand scheme are sufficiently indicated in the quotation above made, and I need not further refer to them except to suggest that until further necessary legal enactments for the purpose are forthcoming (for which we should not cease to agitate), we should, to the best of our power, promote the successful operation of such as are already in existence and designed to prevent the spread of infectious and contagious diseases. Before leaving this subject there is just one matter in reference to which I desire to make a passing notice, viz. the well-meant, though unenlightened, deliberate exposure to contagion by parents of their children in the case of some of the milder forms and types of these diseases (such as measles and hooping-cough) in order that they may contract the disease and "get it over" or "be done with it." I believe that this is a custom which is not uncommon in certain cases, or that, at any rate, the necessary precautions for preventing the spread of such diseases are not so carefully attended to as they might be. In my early days I myself was considerately and deliberately subjected to such a process, by being put to bed with one of my brothers who had measles in a rather mild form; but it was of no avail in my case, and I remained free from the disease. Every one, therefore, is not susceptible, or at any rate readily susceptible, in the case of certain of these diseases; no one need necessarily have them, and many may pass through life without having them at all. In order to secure the abolition of such a custom it would only be necessary, I think, to impress upon our clients that it is not possible to guarantee that contraction of the disease from a mild case will result in the production of a similarly mild form, or that, if mild to begin with, it may not be unfavourably modified by circumstances afterwards; and above all we should remind them of the troublesome *sequelæ* of these diseases, with which we are well aquainted, but which they are apt to forget or be ignorant of; furthermore that every additional case increases the number of *foci* from whence the disease may be spread in all directions.

Leaving the important subject of the zymotic and communicable diseases, I next proceed to consider other diseases of infancy and childhood, which, though not communicable and capable of being abolished altogether, yet, depending as they do on causes well within our control, are preventable to a great extent.

Amongst these we may well consider, in the first instance, *rickets*—which is, according to Sir William Jenner, "the most preventable of all diseases," and, at the same time, "the most common, the most important, and in its effects the most fatal of diseases which exclusively affect children." When we consider the lamentable deformity which results from the development of this disease, and the misery and disadvantages thereby entailed upon the patient so long as he or she may survive, we cannot under-rate the importance of timely interference with regard to it, and of its being recognised and dealt with at the very outset, in order to prevent permanent deformity. And if, as Jenner asserts, the health of the mother has a decided influence in the development of rickets in the child, we have a clear indication that by means of due and previous attention to the mother's health we may do much to prevent the occurrence of the disease at all. Such previous attention to the mother's health, supplemented by proper dieting of the child after birth, and judicious hygienic arrangements, would contribute largely to the stamping out of this miserable disease from our midst; for it is solely and entirely due to neglect of proper precautions and due care in these respects. This disease is fortunately not now so common as it was twenty years ago when Jenner wrote on the subject, and is apparently becoming less common every day, and is likely to become rarer and rarer still with proper attention to the removal of the predisposing and exciting causes giving rise to it. Unfortunately it is, as we might expect from its causation, most common amongst the poor, and there our advice, with a view to preventing the disease when it seems likely to develop itself, is of little use from the want of the necessary pecuniary and other means for carrying it out. I believe that, in such cases, a little timely expenditure, urged by the medical attendant and sanctioned on the part of the poor-law authorities, might, in the end, be a true economy and prevent the latter from being saddled with life-long burdens of deformed humanity. As Jenner says (*Med. Times and Gazette,* March, 1860), "It is very common for the first, or the first two or three children, to be free from any signs of rickets, and yet for every subsequent child to be rickety," and this he explains upon the following grounds:—"that, amongst the poor, the parents are generally worse-fed, worse-clothed, and worse-lodged, the larger the number of their children; for the man's wages remaining stationary, the calls on his means are increased: and, among the rich and the poor alike, the larger the number of children, the more has the mother's constitutional strength been taxed, and the more likely is she to have lost in general power."

Then passing from rickets, we are all well aware what a very large amount of disease continues to prevail amongst infants and young children, due to want of proper attention to their feeding, and clothing, and their general hygienic surroundings, which might be prevented by timely advice and instructions duly administered and attended to. A lamentable amount of ignorance and of thoughtless adherence to old-established customs continues generally to prevail amongst our patients and clients with regard to these matters, and not by any means amongst the lower classes alone. One of the greatest risks to which infants and young children are liable is that from exposure to *cold;* and this is due not only to the greater susceptibility to succumb to adverse influences that of necessity characterises all young and immature beings, but also to the fact, which is not so readily understood and appreciated, viz., that the *smaller* a body is the *larger* in proportion is the *surface.* With this comparatively *much larger cooling surface* in infants and young children, it is evidently very important, then, that we should do our best, as medical advisers, to cause a discontinuance of the absurd and improper practice of clothing such tender and susceptible beings in a manner that we older persons would certainly not like to adopt for even comfort's sake, and which would decidedly increase our chances of taking cold, mature though we are. For these reasons I think that bare arms, bare legs, and even bare heads (where the natural protective covering may yet be wanting) in young children, and the "hardening" processes generally to which they are much subjected, are most strongly to be reprobated and discountenanced in every possible way; and the necessity and desirableness of warm and adequate woollen clothing (without undue coddling) should in all cases be strongly urged, in cold weather at any rate and in this uncertain climate of ours. This theory of the so-called "hardening" of children is not confined in practice to laymen; I have a medical friend (a very successful practitioner) who, with a family of six or seven children, has regularly caused them to go bare-footed, in and about the house, for several years after birth, and I have so seen them running about in the snow in the garden. I don't know whether my friend's children will ever be any the better for the process to which, in their earlier days, they have been subjected; but I can only express a belief that in this climate, and under the circumstances, it was unwise to expose them to great immediate risks with a view to ultimate benefit of a very doubtful and problematic nature. Proper attention to the adequate protection of tender children against cold would doubtless ward off and prevent many of the acute lung disease, and other diseases, such as diarrhœa, &c., often arising from exposure, and unfortunately so common and fatal amongst children.

As to the improper feeding of infants and children, which not only gives rise to immediate results such as diarrhœa (a veritable *running through* of matters that cannot be digested, and therefore act as foreign bodies and irritants), but by means of the imperfect nutrition thereby caused, sows the seeds of much future permanent constitutional defect and disease. The importance of the use of *breast-milk* (either that of the mother, or in default thereof, that of a wet-nurse) or of some *equivalent* substitute, for the first year or thereabouts, cannot be too strongly urged upon our clients. Of course circumstances will not always permit of a mother's suckling her child, and under such circumstances it may not be convenient, or within the means of the family, to provide a wet-nurse; whilst asses' milk, from its scarcity and dearness, is more or less out of the question for general use; but it is quite possible, in such cases, as Dr. Frankland has shown, to make an artificial human milk which shall closely resemble that of the mother's, and act quite as well, as Dr. Frankland proved in the case of some of his own children, and as I have myself proved by experience of its use. And there is no reason why such artificial human milk, for the use of infants, should not be regularly made by chemists and sold for the purpose. Purveyors for such a product would undoubtedly spring up in these days of trade, should there be a fair demand for the article.

(*To be continued.*)

THE PRACTITIONER.

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Original Communications.

A FEW WORDS ABOUT EATABLES.

BY C. B. RADCLIFFE, M.D.

Clericus. I have had a good breakfast.

Medicus. So have I.

C. I should not say so. I have emptied the toast-rack, and helped myself to three or four slices of cold roast-beef; you have had some galantine with brown bread and butter, and not much of them. But I suppose it is all right. I am going in for a hard day's boating; you are proposing to spend the day at home in finishing the diagrams, or tables, which you are going to use to-morrow at the hospital in your lecture on eatables, and which are now very much in the way when I want to see the pictures on the walls, or to take a book from a bookcase. What you have taken would not enable you to do my work.

M. I am not so sure of that. At all events, I am quite sure of this—that you are not wise in eating so much lean meat, in picking out every scrap of fat, and in taking no butter.

C. I want muscular power, and I feed my muscles by eating lean meat, which is muscle. I am right, so far, I suppose?

M. The muscle must no doubt be fed to enable it to act, but you are not at liberty to suppose, as you do, that the amount of urea and other excrementitious nitrogenous matter in the urine supplies the measure of the waste of muscle in muscular action which has to be repaired by food. You must seek this measure, not in the amount of urea eliminated by the kidneys, but in the amount of carbonic acid exhaled in the process of respiration; and the facts with which you have to do go to show that after all this food you are taking may not be that which is most suited to your wants to-day. As is shown in one of the experiments in which Pettenkofer was assisted by Voit, and as you may see in one of the tables which hide the pictures and books here—thus, No. 1—the difference between a day of rest and a day of hard work, as regards the elimination of carbonic acid and urea, is marked not by an increase in the quantity of urea, but by an increase in the quantity of carbonic acid, the actual quantities being

	Grammes of carbonic acid.	Grammes of urea.
On a day of rest . . .	911·5	37·2
On a day of hard work .	1184·2	37·

On the day of hard work there is a very marked *increase* in the quantity of carbonic acid, and a trifling *decrease* in the quantity of urea. What do you say to this fact? Again: as is shown in one of the experiments of Lehmann, and as you may see in this table, No. 2, the amount of urea eliminated by the kidney is, in the main, proportionate to the amount of nitrogenous matter contained in the food; the result of feeding a dog

On a purely animal diet, being . . .	53·2	grammes.
On a mixed diet " . . .	32·5	"
On a vegetable diet " . . .	22·5	"
On a non-nitrogenous diet consisting of fat or grape-sugar or starch . . .	15·4	"

Once more: as is shown by Edward Smith in an experiment upon himself, and as you may see in this table, No. 3, the amount of carbonic acid given off every minute is in direct proportion to the amount of work done in the time, the actual amount being

During sleep	4·99	grains.
When lying down and half asleep . .	5·91	"
When walking at the rate of two miles an hour	18·10	"
When walking at the rate of three miles an hour	25·83	"
When turning the treadmill at the rate of 28·65 feet in a minute . . .	43·97	"

Similar facts are supplied in numbers by these experimentalists, and also by Fick and Winceslaus, and Traube and Parkes, and Pavy, and other excellent observers in this country and abroad, but these three, about the correctness of which there can be no doubt, are sufficient to show that the amount of urea in the urine does not supply the measure of this waste of muscular tissue in muscular action which has to be repaired by lean meat and other nitrogenous food, and that the food you really want to repair this waste may be carbonaceous rather than nitrogenous—simple fuel, rather than plastic material.

C. I shall, I expect, be quite ready for my dinner when I come back. I may have taken more lean meat than I wanted to keep my muscles in trim, I have not taken more than I seem to want. I have been breakfasting in this way for a long time, and I was never in better trim for a long pull than now. I may be eating too much, but you must allow that I am eating the best kind of food.

M. I do not say that you are not eating the best kind of food, I only say that lean meat is not the only kind of nitrogenous food which will serve your purpose. It is impossible to distinguish between the albuminose or peptone into which fibrine is resolved in the process of digestion, and the albuminose or peptone into which albumen, or caseine, or gluten, or legumin is resolved in this process. It is apparently of little or no moment whether these various nitrogenous articles of food are derived from the world of animal life, or from the world of vegetable life. You must allow that a herbivorous animal is not less vigorous than a carnivorous animal; and certainly you would find it difficult to show that man, who can live and thrive under the most dissimilar circumstances upon almost any kind of food, is vigorous in proportion to the amount of meat he contrives to consume.

C. You can hardly wish to depreciate the nutritive value of lean meat.

M. Certainly not. All the nitrogenous substances, animal and vegetable, are resolvable into albuminose in the process of digestion, but not with the same facility in every case. Some of them are digested more easily by some persons than by others;

and besides, there may be differences in the albuminose itself which are recognisable by chemical means. In your own case, lean meat may be more digestible than any other nitrogenous compound, and the albuminose into which it is converted may be more easily assimilated. In another case, eggs or cheese or maccaroni may better suit the requirements of the person taking it. I do not venture to lay down a hard and fast rule for you or any one in this matter; I only want you to understand distinctly that a person who cannot get a full allowance of lean meat, or who does not choose to get it, is not necessarily ill-fed for that reason, even though he have to do hard work with his muscles.

C. If a large amount of nitrogenous food is not wanted as food for muscle or other tissues—for plastic purposes, that is to say—how is the excess disposed of?

M. The part of the nitrogenous food which is not wanted for plastic purposes is, after digestion, resolved by the action of the liver into urea, and the other excrementitious products which are met with in the urine, and into a compound containing carbon, hydrogen, and oxygen without any nitrogen, which compound *may* be the substance called amyloid substance or glycogen. This non-nitrogenous compound is destined to serve as fuel for the production of heat and other forms of force. The portion eliminated as urea, which is simply excrementitious, and the complemental portion, which is destined to serve as fuel, is as 33·20 to 66·80; and therefore it is easy to see that a large part of the nitrogenous food—but little less than two-thirds, that is to say—may be devoted to other than plastic purposes, and that a little more than one-third may be simply wasted. Moreover, the comparatively small portion of nitrogenous food which is actually wanted for plastic purposes, is, there is reason to believe, eventually disposed of in the same way as the portion which is not used for plastic purposes, a little more than one-third being wasted as urea, and a little more than two-thirds being utilised as fuel. And if this be so, the question arises whether the fuel into which a large part of the nitrogenous form of food is resolved sooner or later is the best form of fuel for your purposes—whether, for example, you were wise in picking out the fat and in taking dry toast?

C. I leave you to find the answer to this question.

M. There is, I think, good reason to believe that much of the fuel without which life cannot be maintained may be more easily supplied by non-nitrogenous substances than by nitrogenous substances. The fuel in nitrogenous food is not ready-made. This food has to be transformed, first of all, into albuminose or peptone, and then this albuminose or peptone has to be broken up, partly into the excrementitious portion which passes out of the system by way of the kidneys, and partly into the residual portion which is destined to act as fuel. An abundant supply of gastric and pancreatic and intestinal juices is wanted in order to bring about the proper formation of albuminose; without a healthy condition of liver and kidney it is evident that the albuminose may not be broken up (this breaking-up occurs chiefly in the liver) into urea and amyloid substance or glycogen, and that the urea (which passes out of the system by way of the kidneys) may not be eliminated. Moreover, it seems to be certain that no one can take a large amount of meat and other highly nitrogenous compounds for a long time unless he also do a large amount of muscular work—unless he do much more work of this sort than the great majority of human beings are willing or able to do. Fat and butter and oily matter generally, on the other hand, require no digestion in the proper sense of the word. They are converted into an emulsion—which is no more than a mechanical mixture like cream, by the action of the pancreatic and duodenal juices chiefly, and by the action of the bile partly, and this emulsion passes directly into the general circulation of the blood through the lacteals directly, without going the round of the portal circulation and the liver, as albuminose has to do. Fat and butter and oily matters generally are fuel ready-made, or which only need to be emulsified in order to be in this case; and they have this advantage also — that they are burnt up in the system without leaving behind them, so to speak, any ash like urea. And, as force-producing agents—if the capacity for oxidisation may be taken as a measure—the value of fat and oil is almost double that of fibrine or albumen.

C. I can see that I may have been taking too much lean meat and too little toast; I can also see that I may have been especially wrong in avoiding fat and butter; but I do not see how to set to work to reform my doings.

M. What you have to do, first of all, is to bear in mind that the daily loss which has to be made good by food in a man of medium stature and in moderate work, amounts to 4,800 grains of carbon and 300 grains of nitrogen, and that, in round numbers, lean meat contains 11 per cent. of carbon and 3 per cent. of nitrogen, and bread 30 per cent. of carbon and 1 per cent. of nitrogen.

C. Is it so?

M. Yes. The daily rate of wasting of the system which I have mentioned is that which is brought to light by very many observations, carried on by many persons in various ways, with a view to regulate the food-rations of soldiers and sailors and prisoners, and other ration-fed people; and as to the proportion of carbon and nitrogen in lean meat and in bread the evidence is sufficiently conclusive.

C. Upon these data I can easily calculate how much meat and bread I really want if I choose to live wholly on meat or bread, and how the meat and bread ought to be apportioned if I take meat and bread together.

M. The calculation is ready made for you, and the result shows very plainly that you must mix your lean meat and bread in certain proportions if you care to feed without wasting good food. In order to replace the daily loss of 4,800 grains of carbon by lean meat, the quantity of meat you must take is 43,637 grains, or rather over 6 lbs.—a quantity which contains 1,009 grains of nitrogen in excess of the 300 grains actually wanted. In order to replace the daily loss of 300 grains of nitrogen by bread, the quantity of bread you must take will be 30,000 grains, or about 4 lbs.—a quantity which exceeds by 25,200 grains the 4,800 grains of carbon which are actually wanted.

C. My carnivorous tendencies, then, may not be so very extravagant after all. I never ate 6 lbs. of lean meat, or a third of that amount. I do not think I have suffered any sort of harm from the nitrogen which I may have taken in excess; I am sure I could never eat 4 lbs. of bread, or half that amount, with impunity.

M. There is no occasion for you to eat these monstrous quantities of meat or bread. You must eat 6 lbs. of lean meat every day if you take nothing else but lean meat; you must eat 4 lbs. of bread every day if you take nothing else but bread; but you may get on very well upon a comparatively small allowance of meat and bread if the two were combined in proper proportions. You want every day 4,800 grains of carbon and 300 grains of nitrogen: you find what you want, as Dr. Pavy shows, in 2 lbs. of bread and in about ¾ lb. of lean meat, thus:—

	Carbon.	Nitrogen.
14,000 grs. (2 lbs.) of bread contain	4,200 grs.	140 grs.
5,500 grs. (about ¾ lb.) of lean meat contain	605 ,,	165 ,,
Total	4,805 ,,	305 ,,

C. I quite shrink from the notion of having to take so much as 2 lbs. of bread to make up for the daily waste of my body.

M. You need not take so much, or anything like so much, if you will take fat with your meat, or butter with your bread, or any oily matter in proper quantity. Fat is very rich in carbon, and so are all fatty and oily matters. You would have the 4,800 grains of carbon and the 300 grains of nitrogen which you want, if you took ¾ lb. of lean meat and about 2½ oz. of fat. In proportion as you increase the amount of fatty or oily matter you may diminish the amount of bread; and within certain limits, which you may determine for yourself, you may probably please yourself as to the relative proportions of the two. Whether you would get on satisfactorily by excluding bread altogether, and taking fatty matter in its stead, is another question. The growing chick within the egg has plenty of oily matter to feed upon, and nothing of the nature of starch or sugar, or any other carbo-hydrate to take the place of bread. The sucking mammal finds a large amount of oily matter in the milk upon which it feeds, and a somewhat larger amount of lactine, or sugar of milk, which, as a carbo-hydrate, may more or less take the place of bread. In the hen's egg the proportion of fatty matter to albuminous matter is as 82 grains to 110 grains. In cow's milk the proportion of fatty matter to lactine is as 351 grains to 468 grains, and of these two substances in conjunction, together with caseine, as 811 grains to 369 grains. In 2 lbs. of bread and ¾ lb. of lean meat, the proportion of fatty matter to carbo-hydrates is as ·944 oz. to 16·320 oz., and of both these substances together to nitrogenous matter as 17·264 oz. to 4·908 oz. In point of fact, the proportions of nitrogenous matter, of fatty matter, of carbo-hydrates, and of mineral matter, in the dry constituents of a hen's egg, of a pint of cow's milk, and of 2 lbs. of bread and ¾ lb. of lean meat, according to Dr. Pavy, are:—

(1) In the dry constituents of the contents of a hen's egg:—

Nitrogenous matter . . .	110 grains.
Fatty matter	82 „
Mineral matter	11 „
Total . . .	203 „

(2) In the dry constituents of a pint of cow's milk:—

Nitrogenous matter .	369 grains	·843 ozs.
Fatty matter . . .	351 „	·802 „
Lactine	486 „	1·069 „
Mineral matter . .	72 „	·164 „
Total .	1,260 „	2·878 „

(3) In the dry constituents of 2 lbs. of bread and ¾ lb. of uncooked lean beef:—

	Bread.	Beef.	Total.
Nitrogenous matter .	2·592 oz.	2·316 oz.	4·908 oz.
Fatty matter . . .	·512 „	·432 „	·944 „
Carbo-hydrates . . .	16·320 „	—	16·320 „
Mineral matter . . .	·736 „	·612 „	1·348 „

C. By thus putting the composition of egg and milk side by side with that of bread and meat, the conclusion you would have me draw, I suppose, is, not only that fatty matter is present in large quantity in the two model forms of food, egg and milk, but also that fatty matter may be made to take the place of the starch and sugar of bread.

M. By comparing the composition of 2 lbs. of bread and ¾ lb. of lean meat with that of eggs, you may also, I think, form some idea of the amount of fatty or saccharine matter which is necessary to replace the 2 lbs. of bread. The nitrogenous matter of 6 pints of milk or thereabouts is equivalent to that of 2 lbs. of bread and 3 lbs. of lean meat, for in 6 pints of milk there are 4·082 oz. of fatty matter and 6·416 oz. of lactine; and, therefore, you may conclude that the 4·082 oz. of fatty matter and 6·016 oz. of lactine which are present in the 6 pints of milk are equivalent, for practical purposes, to the ·944 oz. of fatty matter and to the 16·320 oz. of starch and other carbo-hydrates which are met with in the 2 lbs. of bread and ¾ lb. of lean meat. The nitrogenous matter of 20 eggs is about equal to that of 2 lbs. of bread and ¾ lb. of lean meat, for in 20 eggs there are 1,600 grains, or 3·66 oz. of fatty matter; and therefore you may conclude that the 1,600 grains, or 3·66 oz. of fatty matter which are present in the contents of 20 eggs may take the place of its ·944 oz. of fatty matter which are met with in the 2 lbs. of bread and in the ¾ lb. of lean meat, and of the 16·320 oz. of starch and the other carbo-hydrates which are present in the 2 lbs. of bread. For it may be fairly assumed that the properties of the nitrogenous and non-nitrogenous compounds are as properly balanced in the egg and milk, which are the two great typical forms of natural food, as they are in the artificial combination of bread and meat of which we are speaking. You may draw your own conclusions from the tables on the walls in which these facts are set forth.

C. I also find in these tables a curious correspondence as to the amount of mineral matter in the three cases under consideration. The proportion of mineral matter in the other constituents is as 1 to 18 in the egg, as 1 to 17 in milk, and as 1 to 17 in the case of meat and bread.

M. This correspondence may not be quite so close as it seems to be. In the case of the egg an uncertain amount of lime, probably a large amount, ought to be added, for the shell becomes thinner and thinner as the process of incubation goes on, in consequence of the solvent action of the phosphoric acid which is generated by the oxidisation of the phosphorus in the contents of the egg. In the case of white bread (white bread was used in this experiment) the greater part of the mineral matter, which is lodged chiefly in the husks of the grain, is sifted out in the preparation of the flour from which white bread is made. The earthy matter of the shell is certainly necessary to the proper development of the bones of the chick, and in all probability the bones are not the only tissues which are in this case. A dog lives long and thrives when it is fed upon brown bread, but not when it is fed upon white bread. Scurvy also is a speedy consequence of living upon salt meat, which differs from fresh meat chiefly in the fact that the salts belonging to it have been transferred to the brine. If the body is to be properly nourished the mineral matters which are contained in the different articles of food cannot be excluded, that is evident. And if these different articles of food are to be properly digested, the common salt in the food or taken along with the food, may have a very important work to do in addition, for without it it is not easy to see how the gastric juice could acquire that part of its acidity which depends upon the presence of hydrochloric acid.

C. I have always avoided fat and butter on the supposition that they would make me bilious and stout. I also thought that they were specially indigestible. I knew that they were of great value as heat-producers, as "elements of respiration," as fuel, and that the inhabitants of cold countries could not get on well without an abundant supply of them, but it never entered into my head to suppose that they might take the place of meat and bread.

M. You have only to consider how olive-oil is used in the warm parts of Europe where the olive is cultivated, and how ghee is used in India, in order to satisfy yourself that oily matter may be taken with facility in hot countries as well as in cold. You hear nothing about indigestion; you find that a bad olive harvest or scant supply of ghee is a great national calamity. A Hindoo servant of a friend who kept up his Indian habits of eating here in London, has often told me that in his own case nothing would make up for a deficiency of ghee or butter, and that his experience in this matter was the common experience of his countrymen at home or away from home. He looked upon a sip of ghee in very much the same light as that in which his fellow-servants looked upon a draught of beer. "Wine is good, but oil is better," said a peasant to the courier who was with me the other day in Andalusia, and after gulping down a large mouthful of olive-oil and smacking his lips more than once, the expression of his countenance was an apt illustration of the meaning of the Scriptural text which speaks of oil as making "the face to shine." Indeed, it may be taken for granted that oil may be used in large quantities throughout the year in the hot olive-growing countries of the south of Europe, not only without making the people bilious or out of order in any way, but with unmistakable benefit.

C. You have spoken of fat and butter and cream as force-producing agents. You meant heat-producing, I suppose?

M. No; I meant what I said. They are heat-producing agents without doubt, but heat is only one of several modes of force which are closely correlated; and there is reason to believe that the molecular movement which gives rise to heat in one case, may, in another case, give rise to electricity or some other form of physical force. I do not believe that heat is transformed into muscular-force or nerve-force. I believe that the oxidisation of the force-fuel which gives rise to heat in one case, may in the case of a muscle and nerve give rise to the electricity which is peculiar to muscle and nerve; that this electricity antagonises the state of action in both muscle and nerve; that in muscle it also causes elongation of the fibres during the state of rest; and that muscular contraction is brought about by the action of the attractive force which is inherent in the physical constituents of the muscular molecules when this force is no longer antagonised by their electricity. Indeed, all that I want to bring about muscular contraction is, not a metamorphosis of muscle which issues in the development of muscular force, nor a transformation of heat into muscular force, but simply a supply of electricity during the state of muscular inaction which will counteract the tendency which the muscle always has to contract as an elastic body. I want, indeed, not a special muscular force, but merely the common attractive force which is inherent in the physical constitution of the muscular molecules, and electricity to counteract the working of their attractive force when necessary.

C. I begin to see that I should have been in equally good trim for boating upon a very different kind of breakfast—that what I wanted was fuel for force-making rather than food for muscle-making; and now that I call to mind many facts which have been brought under my notice in countries where olive-oil is a staple article of food, I can, after what you have said about the connection of electricity with muscular action, understand how a man whose food is chiefly polenta or potato, with a little bread and oil, should have had as much muscular power at his disposal as ever I could contrive to compass. I once made the ascent of Etna with two Sicilian guides who scarcely ever tasted any animal food except a morsel of fat bacon, and who lived chiefly on polenta and bread and olive-oil. More than once I thought I should never get to the top; they trudged upwards with scarcely a sign of distress, though often having to expend a good deal of strength in pushing or pulling me up. And yet I was in what I thought to be an excellent "condition" at the time.

M. Yes.

C. It is, I suppose, right to believe that most of the weaklings who are benefited in this country by cod-liver oil, in Switzerland by neat's-foot oil, and in Russia by train-oil, would never have required these oils as medicine if their food had been sufficiently rich in fatty and oily articles. Cod-liver oil, I have heard you say again and again, has no special virtue of its own; it does good simply because it is oil. In my parish, where cod-liver oil is now used, suet diffused in milk by boiling the two together, was used formerly, and, I am told, with equal benefit. In the cases where cod-liver oil is wanted the food in all probability has been lacking in fatty or oily matter. More force-fuel was wanted, I suppose.

M. I have a notion that the beneficial action of the fats and oils is not wholly to be accounted for by regarding them merely as force-producers. I believe that they actually serve as food for nerve-tissue. This tissue is in the main made up of a peculiar kind of fat; and I am convinced that nerve is starved if the food be wanting in a sufficient quantity of fatty or oily matter. I find that very many persons suffering from various chronic disorders of the nervous system have abstained from the fatty and oily articles of food, and that their state is almost invariably very much changed for the better when you can get them to take what they have avoided; I also find that a great number of delicate infants who cannot take skimmed milk, and who do not take kindly to unskimmed milk, will take milk without any difficulty when it is enriched with cream. You may say if you will, "These facts only show that the fatty and oily matters have done good in these cases by acting as force-fuel," and I do not care to contradict you flatly. Indeed, all I can say is that I do not think I am illogical in supposing that they may do good also in serving as food for nerve-tissue.

C. I gather from what you have said that you would prefer as food for invalids, milk enriched with cream or some other fatty matter, or the yolks of eggs, or something like the *bouillon* of the French *pot-au-feu*, to highly nitrogenous preparations from which the fat has been carefully skimmed off, such as Brand's Essence, or Liebig's Extractum Carnis, or ordinary beef-tea.

M. That I certainly do; lean meat more or less fluidified, and its juices, are not the *sine quâ non* in food if what I have said be true. On the contrary, I am disposed to think that in very many cases foods of this sort are really unsuitable, if only by calling upon the liver to do work which this organ is unequal to at the time.

C. You approve, then, of the old-fashioned milk diet rather than of the meat preparations which are now so much in vogue?

M. I am quite a believer in the virtue of unskimmed milk as a most suitable food for invalids of all ages in almost all cases; and I think that in very many cases where this fluid does not agree, this difficulty will be got over by the addition of cream or some fatty matter. I can imagine that many mothers who cannot feed their infants in the proper way, or get fresh cow's milk or cream, will have reason to be glad when they can procure preparations of condensed or inspissated milk enriched with various quantities of cream or some fatty matter. I can imagine that preparations more or less similar to those, which, for the reason I have just hinted at, might properly be called brain-food or nerve-food, might make cod-liver oil almost superfluous as medicine, and be of infinite service to countless myriads of persons in whom brain-power or nerve-power is lacking. I can imagine that in many cases it will be difficult to find a food for invalids which is to be preferred to lighlty boiled yolk of egg, or to ordinary egg-flip. And in the cases where it is expedient to use flesh—meat in one form or another—I am sure it will be a great change for the better when, instead of having recourse to beef-tea, or Brand's Essence, or Liebig's Extractum Carnis, the thoughts are turned to something like the *bouillon* of the French *pot-au-feu*, or rather to the very thing itself.

C. In what respect is this *bouillon* better than broth or stock?

M. It is much more pleasant to the taste. It is the outcome of ages of experience in the people who have a special genius for cookery. The animal and vegetable ingredients are so blended that the flavour of no one article is predominant. The *bouillon* contains all, or almost all, the soluble portions of those ingredients which are necessary for tissue-forming or plastic purposes, and for force production, and when taken along with bread, it provides a meal for an invalid which is most palatable, most digestible, and most restorative. It is the basis of all good gravies and soups, becoming, for example, excellent *purée* or pea-soup when a proper portion of pea-flour is added to it.

C. What about the *bouilli* which remains behind in the pot when the *bouillon* is poured out? This cannot be of much use if all, or almost all, the soluble matters have found their way into the *bouillon*. Is it much more than mere *padding?*

M. The *bouilli* cannot be of any very great value as food; and I am very much disposed to think that its place may often be supplied with advantage by bread or potatoes, or some other form of farinaceous food. For myself, I should infinitely prefer a basin of *bouillon* with bread, or a basin of *purée* with bread, to a basin of *bouillon* and a plate of *bouilli* after it, without bread; and I think my instincts do not mislead me in this matter. I have a small appetite, and no superabundance of digestive power; my inclinations turn towards vegetable food rather than towards animal food, and I can easily see that farinaceous food may be really more suitable to the wants of my system than anything which is left behind in the *bouilli*.

C. I have for years been trying to make the poor in my parish acquainted with the virtues of the *bouillon* and *bouilli* of the

French ordinary *pot-au-feu*,[1] but it never entered into my head to suppose that the *bouillon* was ever to be preferred to the *bouilli*, or that bread, or potatoes, or pea-flour, or polenta might now and then be substituted for the latter with advantage. I have also been a good deal interested in an attempt which is being made by Messrs. Nelson, of Warwick, to introduce as cheap articles of food the inventions of our late friend Mr. J. R. Johnson, which are really properly made *bouillon*, and *purée*, and other soups in the form of dry chips. From a package of one of these preparations, which may be easily carried in a corner of the waistcoat pocket, an excellent mess of *bouillon* or *potage* may be got in a few minutes with the help of a little water and fire, and I can easily see that the invalid and

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[1] For making an ordinary *pot-au-feu*, Gouffé, in his *Livre de Cuisine* (Paris, Hachette, 1867), tells us to take of

Fresh meat	about	1¾	lbs.
Fresh bones (smashed)	,,	¼	,,
Leeks	,,	7	oz.
Carrots Onions Turnips	,,	5½	,,
Parsnips	,,	1	,,
Celery	,,	⅓	,,
Salt	,,	1	,,
Clove		1	
Caramel		a very little.	
Water		7 imperial pints.	

Having placed the meat and bones in the stew-pan, with the bones undermost, the water is poured in, and the salt added. Then, after putting it upon the fire and allowing it to remain there until the water boils, and a scum collects upon the surface, the pan is removed from the fire and the scum skimmed off, a little cold water being first added for some purpose or other which is more intelligible to a cook than to me. Then this process of boiling, adding a little cold water, removing from the fire, and skimming, is repeated twice. Then, and not until then, the vegetables are added, and the pan is placed near enough to the fire to allow the contents to simmer (not to boil) for three or four hours. Then the *bouillon* is poured off and the *bouilli* prepared as a dish in one way or another. And lastly, when the *bouillon* is in the soup-tureen, and not until then, enough caramel is added to it to give it a delicate orange tinge—*une tainte dorés.* The lid of the stew-pan is never to be closed down tightly, for if this be done the *bouillon* is very likely to spoil by becoming thick and muddy.

The quantity given here is for four or five persons. To try and make less, Gouffé tells us, is bad economy, likely to issue in bad cookery, and this is intelligible enough, for the *bouillon* may be used in various ways, not only on the first day, but on the day following. The imperial pint, containing twenty ounces, is the pint referred to.

the working man will both of them be great gainers in the matter of proper food, as well as in pocket, when this discovery is taken advantage of.

M. I, too, have been greatly interested in the articles to which you refer. I have tried the specimens which have been sent to me, and I highly approve of them. I think, indeed, that their introduction to the public marks a new epoch in the proper feeding of our countrymen, and that they will be made still more suitable for food when they are enriched to some extent by some form of fatty matter. I know how difficult it is to convince the poor of this country that all food is little more than *padding* except steaks, and chops, and cuts out of joints; and it will be long, I fear, before they can be persuaded to avail themselves of these preparations, or to learn to make for themselves the *pot-au-feu* of our neighbours across the Channel.

C. What else have you to say in the way of criticism about my unfortunate breakfast ?

M. Only a word or two about bread and other farinaceous articles of food, and about the reason which made me prefer my gelatinous galantine of veal to your cold sirloin of beef. I think that bread may still be very properly spoken of as "the staff of life," and that other farinaceous articles of food may very properly be admitted into the same category with bread. The composition of wheaten flour—which is more or less that of all flour prepared from cereal grain (oats, rye, barley, maize, rice, and the rest), and of leguminose seeds or pulse (peas, beans, lentils), and also of potatoes and some other tubers and roots—according to Dr. Letheby, is—

Nitrogenous matter	10·8
Fatty matter	2·0
Carbo-hydrates (starch, sugar, and the rest)	70·5
Mineral matter	1·7
Water	15·0

The nitrogenous matter consists of vegetable fibrine, albumen, and gluteine in the rough form of gluten. The fatty matter is in no way peculiar. The non-nitrogenous carbo-hydrates are starch, dextrine, sugar, gum, cellulose, and lignine—starch chiefly. The mineral articles comprise phosphates of lime and magnesia, salts of potash, and soda, and silica. Leguminose seeds or pulse contain as much as from 25 to 30 per cent. of nitrogenous matter, mainly in a form of caseine called legumine rice and potato contain as little as about 8 per cent. of nitrogenous matter, and as much as 80 per cent. of starch, the amount of nitrogenous matter and starch in these articles of food being in an inverse ratio to each other. Fatty matter is especially abundant in oats and maize. It is evident, therefore, that there is much in these vegetable articles of food which may take the place of the nitrogenous and oily articles which are supplied in animal food.

There is no essential difference as to chemical composition between vegetable albumen, and fibrine, and legumine, and oily matters, and animal albumen, and fibrine, and caseine, and oily matters; there is no perceptible difference in the albuminose or peptone into which the vegetable and animal nitrogenous substances are alike transformed in the process of digestion; there is no difference in the way in which the vegetable and animal oily matters are emulsified, and then taken up directly into the general circulation of the blood. Nor is it difficult to see how the starch, and sugar, and other non-nitrogenous materials which are peculiar to vegetable bodies are disposed of within the system. The way in which starch is disposed of in the stomach and bowels is not very well made out, and all that can be affirmed with certainty is that a great part of it finds its way into the liver through the portal system of vessels, and is detained there for a time in the form of amyloid substance or glycogen—a detention which is not altogether unaccountable, for, as Dr. Pavy points out, this substance "possesses diametrically opposite physical properties to sugar, being a colloid, and therefore non-diffusible, instead of a crystalloid and diffusible." There is no sufficient reason to suppose that the action of digestion, be that what it may, is always to transform the starch into sugar; for sugar in quantity could not be formed in the stomach and bowels without passing directly into the general circulation, and so out from the blood into the urine by way of the kidneys—without making, that is to say, the phenomena of diabetes a natural state of things instead of an unnatural. Nor is there sufficient reason for supposing that the amyloid substance of the liver is transformed into sugar, for this substance is as readily oxidisable and as fit for force-fuel as sugar. Nay, it may be questioned whether sugar itself is the force-fuel which the system is in need of. There is a very rapid generation of lactic acid in the stomach and bowels when sugar is taken as food, and it is not unintelligible that it should be so; for, with the help of a ferment of some sort, grape-sugar is readily converted into lactic acid. Indeed, all that has to be done is for one atom of anhydrous grape-sugar to split up into two atoms of lactic acid. Nor is it unintelligible that a certain part of the starch taken as food should pass, as it would seem to do, not into amyloid substance or glycogen, or into sugar, but first into dextrine, then into sugar, and then into lactic acid: for, as is seen in the list which I show you, there is a close chemical correspondence between these various substances and those which are akin to them. Thus:—

	Carbon.	Hydrogen.	Oxygen.
Starch	12	10	10
Dextrine			
Cellulose			
Lignine or woody matters			
Gum			
Cane-sugar	12	11	11
Grape-sugar	12	12	12
Amyloid substance			
Lactic acid	6	6	6.

There is no difficulty, therefore, in understanding, to some extent, how it is that, under the action of pepsine, or diastase, or some other ferment, starch, and dextrine, and cellulose, and lignine, and gum, and cane-sugar, and grape-sugar, and amyloid substance may be transformed into the lactic acid which forms so important an ingredient in gastric juice, and that the lactic acid so formed, after having done its work in digesting nitrogenous substances, may be absorbed into the circulation directly, and be there disposed of in oxidisation as a very readily inflammable fuel—perhaps as the more readily inflammable of all the force-fuels. And certainly there is no reason to believe that amyloid substance or sugar is more inflammable than lactic acid, but rather the contrary, for lactic acid cannot be traced, as amyloid substance and sugar can be, beyond the limits of the alimentary canal. In any case I am, I think, at liberty to assume that a good deal of starch and sugar, and of the articles akin to them, are of great use in supplying lactic acid, and that this lactic acid has to do very important work, not only in the primary processes of digestion, but also as force-fuel.

C. If this be so, the effect of taking sour butter-milk, sour milk, and sour whey—the sourness of which depends upon the presence of lactic acid—ought to be unequivocally beneficial in many cases.

M. So it is. I have long been in the habit of recommending these articles in cases where the digestive power is feeble and the circulation wanting in vigour, and I am quite satisfied that the practice is very satisfactory in its results. Instead of being "a weight to the stomach," as fresh milk often is said to be in these cases, these drinks are generally found to facilitate digestion and to keep up the warmth of the system. Indeed, by using sour butter-milk and sour whey, I have often found it possible to leave off doses like rum and milk and to do without alcoholic drinks altogether.

C. I am prepared to believe what you say by what I know of the experience of those who take sour milk or sour butter-milk habitually or who have tried the whey-cure. I have more than once heard an Irish peasant say that he misses the sour milk he takes along with his potatoes almost as much as the potatoes themselves, and that "it warms him like whisky and keeps off the rheumatiz." I have again and again felt myself benefited by taking butter-milk—by returning to what was a common practice in the district in which I spent my boyhood. And, certainly, I find it difficult to turn a deaf ear to all that I have heard in praise of the whey-cure in Switzerland and elsewhere by those who have tried it for dyspepsia and rheumatism.

M. I was led to recommend sour butter-milk or sour whey by reflecting on the very facts to which you refer.

C. What about the fattening effects of starch and sugar and other carbo-hydrates? Are these substances convertible into fat?

M. Possibly, nay, probably. At the same time I am disposed to think that in many cases the apparent transformation into fat is to be accounted for by the storing up in the system of the fatty and oily materials of the food—that these materials may remain behind by being, perhaps, less combustible than the lactic acid into which amylaceous and saccharine substances are naturally transformed.

C. You have still a word to say in justification of your preference for your gelatinous galantine.

M. The nitrogenous alimentary substances are divided into proteine compounds and non-proteine compounds. The former (the albuminous group) albumen, fibrine, caseine and their varieties, yield proteine when treated by heat and an alkali; the latter (the gelatinous group) containing gelatine and chondrine—gelatine prepared from bone and structures containing fibrous tissue, chondrine prepared from cartilage—does not yield proteine when so treated. Proteine is looked upon as the base or radical of the albuminous group; but it may only be an occasional chemical product. In any case it does not do to suppose that the non-proteine compounds forming the gelatinous group are useless as articles of food. The proteine and the non-proteine compounds are all reduced to albuminose in the process of digestion, and resolved afterwards in the same way into urea and the residual force-producing compounds which in all probability is amyloid substance or glycogen. An animal soon dies if it be fed solely on gelatine; and so it does also if it be fed solely on albumen, or fibrine, or starch, or sugar, or oily matter. The different elements of food, animal or vegetable, must be mixed in certain proportions, which are not yet very clearly made out, before an omnivorous animal can thrive upon them. There may be no occasion to take gelatine as food, for gelatine and chondrine are certainly formed in the system from any kind of albuminose; there cannot well be any harm in taking it, for, as I have said, it is transformed into albuminose like any other form of nitrogenous substance; and there may be great good in taking it, for the coatings of the cells and fibres of muscle and nerve are made up of a structure like elastic tissue, which yields gelatine in abundance. Indeed, the popular notion that there is something specially strengthening in jelly may not be altogether a fallacy. I can easily believe that the gelatine may be wanted to provide for the proper nourishment of the coatings of the fibres and cells of nerve and muscle, and that a lack in this provision may bring about an abnormal disposition to involuntary action in nerve and muscle. I believe that these coatings are charged as the walls of a Leyden jar are charged during the state of rest, and that the degree of this charge and the indisposition to discharge is in proportion to the integrity of these coatings; in other words, I believe that the discharge which attends upon and produces this state of action, voluntary and involuntary, in nerve and muscle alike, is more likely to happen in the case where these coatings are insufficiently developed than in the case where they are sufficiently developed; and so believing, you will easily understand why I think that gelatine may really be of high value as an article of food. You know what I mean; if you don't, I must refer you for further information to the second edition of my book on *Vital Motion as a Mode of Physical Motion*, which will be published in the course of a few days.

C. You must not be hard upon me if I do not bring my ways of feeding into exact accordance with yours all at once. I must have time.

M. You will not be in time for your appointment on the river if you do not make haste. So good-bye for the present.

OBSTRUCTION OF THE BOWELS.

BY J. DICKSON HUNTER, M.D. EDIN., AREQUIPA, PERU.

Cases of obstruction of the bowels present such difficult problems for solution, and are generally so serious, that any contribution which may assist in their elucidation or treatment must be of some value. Moreover, in one of the standard works on surgery (Erichsen, 4th ed.), though an examination of the rectum is insisted upon, nothing further is said in this direction. For these reasons the following case may be of interest.

One morning, February 23, I was called to J. A. He had that morning been carried in from the country, a distance of two leagues (six miles). I saw him at 9 A.M. He was a muleteer, and a strong, healthy-looking man, æt. 50. I had attended him on some previous occasions, but these ailments had no connection with the stomach or bowels. He had left his home on February 15 in perfect health, acting as muleteer in the service of Professor Falb, the Austrian astrologist and earthquake prophet (!). J. A. had not, however, to make any great exertions, nor was he much exposed to the cold, as he remained at a post-house looking after the mules while the Professor went to the top of the volcano (more than 18,000 feet above sea-level) to make his observations. On the 18th he felt ill, but is not sure whether his bowels were moved. On the 19th, early in the morning, he had severe pain in the abdomen, and with great difficulty managed to ride home. He was sure that the bowels had not been moved since the previous day (18th) up to the time of coming to town. He was seen in the country by a native practitioner. This gentleman administered narcotics, antispasmodics, and purgatives by mouth and rectum, besides applying poultices, fomentations, twelve leeches, and belladonna and mercurial ointment to abdomen. He had also tried large enemata of oil and warm water, but before any amount could be introduced they were ejected.

I found him seated in bed, the body slightly inclined backwards. He could not sit up erect nor lie down, owing to the great distension of the abdomen. Pulse and respiration frequent, temperature above normal. Tongue dry and red. He was constantly sucking ice. At intervals he vomited, but it was apparently only slightly discoloured water. Occasional hiccough. He had not passed urine since 4 P.M. the day previous. He did not complain much of pain, more of the feeling of distension. On uncovering the abdomen it was seen to be enormously distended (I regret not having taken any measurements), and was tympanitic over all the front part. I ordered opium, and arranged for a consultation with Dr. Montesinas, a Peruvian educated in Paris. We met at 2 P.M. The patient passed a small teacupful of urine at midday. I now examined per rectum, which was empty. I then tried the long tube, guiding it in different directions with the finger, but very gently. The tube, after passing the point of the finger some two or three inches, met with an obstruction that was not to be overcome. I now tried a No. 10 catheter with a like result. Seeing that the respiration was so embarrassed by the distension, we determined upon puncturing the abdomen. About three inches below the ribs on the left nipple line there was a particularly prominent-looking part. To this we applied carbolised oil, and having also oiled an aspirator trocar I struck it in somewhat sharply. Immediately flatus could be heard and smelt escaping. At intervals lighted wax matches were held in front of the trocar and were quickly extinguished. When at length one burnt steadily the instrument was withdrawn and oiled lint applied. Though the distension had considerably diminished, there was still a considerable prominence in a corresponding situation on the right side. I therefore punctured there also, but no gas escaped. This is easily accounted for by the supposition that the intestine being now less tense, receded before the point of the trocar. A broad bandage was applied, and he was ordered to continue the opium. In the evening I found that he had slept at intervals and again passed a little urine. He took only the ice and medicine, and would not touch any nourishment.

On the 24th Dr. Montesinas and I met again at 10 A.M. The patient had slept a little in the night, but the hiccough and vomiting were more frequent. The distension was as great as before the operation. It seemed to us that the distension was most pronounced in what might be the transverse and descending colon. We determined upon making a more thorough examination. Dr. Montesinas administered chloroform. When the patient was well under its influence he was placed on his left side, the nates drawn to the side of the bed, and the knees bent. I again carefully tried the tube and catheter, but without result. I therefore introduced the hand, oiled of course. When the hand (length eight inches) had been fairly introduced, it was found to be comparatively free in a vaulted cavity without any apparent exit. Here I found the advantage of having frequently used my left hand in obstetrical operations. Upon careful examination I felt a slight projection, something like a soft but not prominent os uteri, with a central depression. Into this central depression I insinuated first one finger and then another until all the fingers were introduced in a conical form. I now proceeded slowly dilating and advancing, until I found my hand free in a large roomy cavity and in contact with a soft pultaceous substance; no hard lumps of any kind were felt. From the tip of the middle finger to the point where the arm was grasped by the anus measured sixteen inches. I now passed the long tube along the front of the arm and hollow of the hand; immediately there began to escape a dark green semi-fluid and flatus. I now withdrew the hand. The fluid continued escaping but slowly, so remembering the effect of warm water upon the exhausted uterine muscles, we ordered warm water to be injected by the tube. The effect of this was most satisfactory—more and more of the always dark green fluid and gas escaping, partly by the tube, and partly by the side of the tube. Considering the excessive tympanites that had existed it was astonishing to see the very large amount of this dark green fluid which was ejected. No scybala were expelled. The patient, as he was recovering from the chloroform, made voluntary expulsive efforts, increasing the amount ejected. The abdomen being now soft and flat, and the patient expressing himself as feeling better, the tube was withdrawn.

Ordered tablespoonfuls of chicken-soup, opium if there was pain, and spongiopiline wrung out of hot water to abdomen.

In the evening I found that he had slept, had passed water twice, and had had one copious motion of the same character and colour. He had taken only a few tablespoonfuls of soup and one or two of tea. He loathed food and preferred the ice only. His pulse was still frequent, but all vomiting and hiccough had ceased. He expressed himself as feeling well, the only thing he complained of being a little soreness about the anus — he had some small external hæmorrhoids.

During the first three days of convalescence he would hardly take any nourishment, not even milk and lime-water with ice; perhaps this was advantageous under the circumstances. Otherwise he progressed favourably, and in a fortnight left for the country, where he has continued well, without any recurrence after one year.

It will have been remarked that though the obstruction was situated low down, the urine was scanty. The amount of urine I should think rather a fallacious index of the seat of obstruction. In this case the urine was scanty, probably owing firstly to fluids being quickly rejected, and secondly to the amount of opium he was taking.

Dr. Keiller, of Edinburgh, to whom I communicated this case, has suggested that the hand and arm introduced into the bowel might be of service in the diagnosis of certain obscure uterine affections. I have thought that it might be employed along with external manipulation for twisting upon their axes ovarian or pedunculated fibroids of the peritoneal surface of the uterus, or even be useful in some cases of strangulated hernia as a means of dragging upon the bowel from within the abdomen.

ANATOMICAL AND EXPERIMENTAL INVESTIGATIONS MADE DURING THE YEARS 1868-69, RELATING TO THE COMMUNICATION OF TUBERCLE BY INOCULATION, AND THE PATHOLOGICAL NATURE OF THE LESIONS RESULTING THEREFROM.

BY J. BURDON SANDERSON, M.D., F.R.S.

(*Continued from* p. 200.)

In most cases the nodules are very equally dispersed through the affected organs; exceptions occur in which one lobe is found to be more abundantly infiltrated with new material than the rest, but these appear to be accidental, all parts of the organ being apparently equally liable to become the seat of consolidation. In one of the animals I counted 63 separate subpleural nodules, which were disseminated with equal frequency over the whole of the surface of both lungs, while as regards several others it is noted that they were too numerous to be counted. Although, as has been already stated, the greater number are superficial, there are many which occupy central positions, and these, so far as I have been able to ascertain, are invariably found in the neighbourhood of bronchi. It was never observed that the deposits were surrounded by a zone of inflammation. Occasionally the lung tissue around their margins was slightly injected, but this appearance was neither constant nor definite; the adjoining lung tissue was in general perfectly healthy in structure and appearance. It has already been stated that, in those cases in which the whole of a lobe was converted into a mass of new deposit, the appearance and consistence of the material were evidently the same as of that which constituted the nodules, for often, as in No. 21, it could be distinctly seen that what resembled infiltration was produced by the mere grouping together of smaller masses; it must at the same time be admitted that the difference between the confluent and disseminated forms of lesion was not entirely one of degree, for sometimes it was noticed that the whole of one of the lobes was consolidated, as in No. 14, although in other parts of the lung the amount of new material was inconsiderable.

In every case in which the nodules had attained a considerable size their centres were found to be softened. In one animal, No. 8, this softening had proceeded to such a degree that some of the masses were converted into vomicæ containing creamy fluid.

Microscopical Characters of New Growths.—In the microscopical examination of the morbid growths above described, it was found that very little progress could be made unless the parts to be examined were first hardened by steeping them for several weeks in a solution containing one-quarter per cent. of chromic acid. The anatomical statements contained in the following paragraphs are founded entirely on the examination of sections of diseased lungs prepared in this way.

The disease always originates in the form of minute granulations, each of which, so far as I have been able to ascertain, is situated around, or in the immediate neighbourhood of a minute bronchiole, usually a bronchiole of three or four thousandths of an inch in diameter. Each of these granulations was found on more minute examination to consist in the main of adenoid tissue, that is of tissue resembling the pulp[1] of the cortical substance of a lymphatic gland; in other words, it is composed of nuclei, most of which appear to be free, although many of them are enclosed in "cells" little larger than themselves. These elements are embedded in a sponge-like stroma of extreme delicacy, in which no fibres or vascular channels can be distinguished.

The mode of origin of this tissue can only be judged of after its relation to the original structures of the lung has been determined. . . . The examination of diseased lungs in the earliest stage of alteration seems to show that . . . at first the new growth is confined to the immediate neighbourhood of the bronchioles, from which it extends to the walls of the adjoining air-cells; here it gives rise to a general thickening of the alveolar membrane, and consequent reduction of the capacity of each alveolus and consolidation of the affected part. As the process goes on, the bronchioles leading into the affected air-cells probably become more or less obstructed, but do not undergo any appreciable change of structure, for in bronchial tubes which are surrounded on all sides by adenoid growth it may happen that there is no alteration either in the epithelium or in the tube wall; there is not the slightest sign of any inflammatory process affecting the bronchial mucous membrane. Eventually the diseased part becomes completely consolidated. This is brought about partly by the interstitial growth of cells in the substance of the alveolar walls, partly by the accumulation of epithelium in the alveolar cavity. Whether by compression of the ultimate bronchus, or for other reasons, the epithelium collects in the vesicles, already reduced in size by the parietal thickening, so as to fill them up. In this way the diseased tissue is converted into a compact mass of cells, which to the unpractised or careless observer seems to have no special arrangement, and to be all of the same kind; if, however, they are more critically examined it is soon seen that there are two kinds of cellular elements, those of the one kind being at least twice as large as the other, and that the larger cells are grouped together in nests. These nests correspond to the cavities of alveoli, and are in fact clumps of alveolar epithelium. They are distinguishable from the others not merely by their size and well-defined outline, but by the fact that most of them contain minute black pigment granules, which occupy their perinuclear spaces in considerable numbers. In comparing them with the alveolar epithelium of healthy lung it is easy to satisfy one's self that their characters are in the main unaltered.

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[1] This pulp consists of masses or nests of cells, identical in their character with those described in the text, which are held together by a delicate network of transparent material, wherein capillary blood-channels are contained, and fibres of extreme tenuity can be detected.—See Kölliker, *Handbuch der Gewebelehre des Menschen*, 1867, p. 474.

The next stage in the morbid process consists in the disintegrative change which gives rise to the appearance of white or yellowish opacity always observed in the centres of the larger nodules. Both the epithelial cells and the parietal new tissue alike participate in it. The nuclei of the latter break up into smaller corpuscles of irregular form, while fat granules appear in great numbers round the nuclei of the epithelial cells, so that the whole is eventually converted into a granular detritus, in which the only well-characterised forms are large cells so loaded with fat granules as to resemble conglomerates.

If the changes referred to in the preceding observations have been correctly described they tend to show that, as regards the lungs, the effect of tuberculous inoculation is to give rise to the growth of new adenoid tissue in the interstitial substance which surrounds the smallest bronchioles and constitutes the alveolar walls. The nodular form and disseminated character of the growth seems to me to be partly accounted for by their relation to the terminal bronchioles, for it may be readily understood that a growth taking its start from a bronchiole and extending peripherally would be likely to assume the conical form of that part of the lung to which the bronchiole leads.

During the latter part of 1868

[I devoted much attention to the examination of the healthy lung in the guinea-pig, for the purpose of ascertaining whether or not masses of adenoid pulp are to be found in it, particularly in those parts which appear to be the favourite starting-points of tubercle. From the examination of a number of specimens, I have ascertained that masses of cytogenic tissue of irregular form are always to be found in the neighbourhood of the bronchi. Those which are in relation with the smaller branches lie in the loose common connective tissue by which these tubes as well as the blood-vessels are separated from the air-cells, while those which lie near bronchi of sufficient size to be possessed of cartilages are found to lie in a corresponding position outside of the fibrous layer in which the cartilages are embedded. In every instance I have found the adenoid masses occupying a position between the air-tube and the nearest artery, with the outside of the adventitia of which the surface of the mass is usually, if not always, found in contact. It was never, however, observed that the arterial adventitia was in the slightest degree modified, so that the mass could not be regarded as a development from that structure. It is further to be noticed that in injected lungs the masses were found to be vascular, minute capillaries not only ramifying on their surface, but penetrating into their interior. I am unable to state anything from my own observation as to the relation of these bodies to the lymphatic system; but inasmuch as they lie in the course of the absorbent vessels, I have no doubt that they are in direct relation with the lymph stream.[1] . . .

In animals killed at an early stage of tuberculosis, that is to say, about four weeks after inoculation with tuberculous matter, no change is observed excepting that the peribronchial adenoid pulp is increased, or in other words, that true miliary granulations are formed in the neighbourhood of the terminal bronchioles. This fact appears to afford the key to the mode in which the iron-grey nodules are produced. Whether the choking up of the air-cells is a merely mechanical result of the accumulation of adventitious matter around the bronchioles or of a catarrhal process, there can, I think, be little doubt that the granulation stands to the block of lobular pneumonia in the relation of cause to effect, and that when a kernel of adenoid pulp occupies the centre of a nodule the fact signifies that the nodule originated from it.]

3. *Appearances observed in the Liver.*

The liver, which in the healthy guinea-pig constitutes from a twenty-fifth to a twentieth of the weight of the animal, often attains a weight two or three times as great under the influence of the tuberculous infection. In one of the animals (No. 22) the organ weighed 46 grammes, that is 9 per cent. of its weight. The greatest relative weight was 12 per cent., in guinea-pig No. 16. The mean relative weight of the organ in 10 animals, in all of which the liver was markedly diseased, was 7·8 per cent.

Two kinds of lesion were noticed; the most obvious, and to the naked-eye observer the most common, consists in the conversion of certain abruptly defined portions of the hepatic tissue into a white opaque material. These isolated masses were met with in various parts of the organ, and varied almost indefinitely in size and form. In the advanced stages it sometimes happened that they were so large that a single mass fully occupied one of the three principal lobes into which the organ is divided; but more frequently they did not exceed a quarter of an inch in diameter. In form they are not altogether unlike the nodules of the lung. Some are completely concealed, but by far the greater number lie immediately under the capsule. Like the pulmonary nodules, they do not change the form of the organ in which they exist, for they are thoroughly incorporated with its tissue. In most of the animals they were found in greatest numbers in the neighbourhood of the sharp margin, and were less numerous in the middle or right lobe than in the left, to which it indeed several times happened that they were exclusively confined.

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[1] The correctness of this inference was subsequently (1875) proved by the exhaustive researches of Dr. Klein. (See *Lymphatic System*, part ii. chap. 6.)

These opaque masses, which I shall hereafter call *islands,* have several peculiarities obvious to the naked eye, which render it easy to distinguish them from all other disseminated deposits. When small they are of a dead-white colour, and of a firmer consistence than that of the organ itself of which they form part. As they enlarge, the colour changes from white to yellow, and the consistence diminishes, both alterations beginning from the centre; so that in all large islands there is a kernel of soft bile-stained pulp, and a cortex of firm material. Along with the softening there is diminution of bulk, for in the superficial islands the surface becomes so concave that the capsular membrane seems as if stretched over a cavity hollowed out of the mass. It is further to be noticed that the margin of each is commonly surrounded by a bright edging of hyperæmia, such as one sees in the human subject around splenic infarcts.

The above alteration is probably consequent on another less obvious change in surrounding parts of the liver. Both are in fact manifestations of the same process, in the development of which, the lesion now to be described stands first. The healthy liver of the guinea-pig is of an even red colour, resembling that of muscular fibre, but somewhat deeper. The elevations of surface which correspond to the acini can be made out on its external surface when the organ is so placed as to reflect a pencil of light to the eye, but there is no perceptible difference of colour between the lobules and the interlobular spaces. As soon, however, as the organ becomes diseased its size increases while its colour becomes paler. On more attentive examination the paleness is seen to be very unequally distributed, occurring here and there in patches of grey mottling, especially in the neighbourhood of the islands, if any exist. On making sections of such a liver the mottling is even more apparent than on the natural surface. The grey parts obviously differ in appearance from the islands; while the islands are absolutely opaque the mottling is semi-transparent. To the practised eye the one conveys the idea of a living, growing tissue, while the other suggests fatty degeneration or necrosis.

As the process advances, two important characters manifest themselves. First, the organ changes its form. This change is of such a kind as to remind one of the hobnail or cirrhotic liver of human pathological anatomy, a resemblance which, however, is only partial. Each lobe is seen to be divided by deep furrows extending in various directions across its under surface, into prominent nodosities. The second consists in the extension of the mottled appearance to the whole of the diseased and enlarged organ. When this has taken place it becomes possible, even with the naked eye, to satisfy one's self that the pale parts are interlobular, and that the less altered points correspond to acini.

The microscopical examination of the liver in disease is beset with difficulties. My study of the changes above described is as yet incomplete. It is, however, sufficient to enable me to draw some important conclusions as to the relations with the other lesions observed.

The "islands" contain scarcely any elements foreign to the structure of the liver. Each consists in its unsoftened state of a certain number of acini in an anæmic condition. The softening is a process of retrogressive change. The tissue loses its vitality apparently from want of blood. The gland-cells eventually undergo fatty degeneration, and become disintegrated; but, evidently, this is not the beginning of the change, for in islands of recent growth and inconsiderable extent the cells are in a natural condition.

The grey interlobular deposit consists of adenoid tissue. To investigate it, it is necessary to harden the organ in solution of chromic acid. . . . In moderately thin sections through the whole of a diseased lobe, made so as to cut across the channels in which the ducts and vessels are contained, ... it is seen that the new material forms masses which are so arranged in relation to the bile ducts that each seems to be surrounded by a zone of transparency, and . . . . that this arrangement is not confined to the larger ducts, but extends to the smaller interlobular ramifications. . . .

The grey semi-transparent material consists of adenoid tissue, that is, of a delicate sponge of transparent connective substance, in the cavities of which minute cells or nuclei are lodged.[1] The diameters of these cavities are seen on section to be about $\frac{1}{1500}$ of an inch. They communicate with each other in all directions, being bounded by membranous septa. The nuclei have a mean diameter of about $\frac{1}{5000}$ of an inch. They are uniformly spheroidal, retaining their rounded contour even after the addition of dilute acetic acid. They are so firmly kept together by the connective substance that it is difficult to examine them apart. So far as can be ascertained most of them seem to be surrounded by a cell wall, others by irregular masses of transparent material, which may be probably regarded rather as bits of interstitial substance than as vesicular membranes, while others again seem to be the centres of stellate or caudate fibre corpuscles. The relation between the adenoid tissue and the ducts and vessels resembles that which is seen in the lung. In every section of an interlobular grey mass one or more bile ducts can be seen lined with characteristic epithelium, and closely surrounded by masses of adenoid tissue. As was observed with reference to the bronchial tubes, so in the liver, the epithelium of the bile duct is entirely unchanged. The relation of the new tissue to the hepatic arteries is similar. The arteries are embedded in it, but are not themselves altered, nor do I see any ground for the belief that the disease commences in their sheaths.

The relation between the interstitial new growth and the islands is not so clear as could be wished. The absolute whiteness of the islands in their early state seems to indicate that they are entirely cut off from the circulation. It cannot be supposed that this is due merely to the obstruction of the hepatic arteries by the development of adenoid tissue around them, for in several instances I have met with livers in which no islands existed, notwithstanding that the new growth evidently constituted the greater part of the bulk of the organ. The only explanation that suggests itself to me is that in those acini which are surrounded by new growth, the intralobular circulation is so compressed as to render them anæmic; for it is not difficult to understand that in a portion of liver which is the seat of adenoid degeneration such lobules as remain in a comparatively unaltered condition will be likely to become anæmic. However this may be, it is evident that an island once formed is as much out of the circulation as an embolic infarct in the spleen or kidney, which it resembles in being bordered by a ring of venous congestion.

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[1] See *Minute Anatomy of Pulmonary Lesions.*

[*Relation of the New Growth to Existing Structures.*—In the liver, as in the lymphatic glands, different parts of the same organ are always found to be in different stages of alteration. Thus at an early period, as, for example, six weeks after infection, the only changes which can be discovered by the naked eye consist in general enlargement and unnatural paleness of the whole organ, with granulations, masses, or laminæ of transparent material scattered through its substance. But on minute examination, even of the most healthy parts of such a liver, important structural alterations are discovered, both in the acini themselves and in the interlobular tissue. In cross sections of the interlobular spaces, *e.g.* sections made near the surface in planes parallel to that of the capsule, it is seen that the interlobular vessels and ducts, instead of being in immediate contact with the peripheral ends of the columns, are sheathed in adenoid reticulum . . . which fills up all the space not occupied by the vascular structures. . . The portal veins and arteries are unaltered, but it is constantly observed that the ducts, and especially those that are in immediate relation with liver cells, are enlarged, and that their epithelium has lost its regularity of arrangement. From the examination of a great number of similar sections, I infer that in the interlobular spaces the disease begins as an overgrowth of the normal adenoid pulp of the portal canals. . . .

The eventual result of the morbid process is the conversion of the whole organ into a mass of semi-transparent aspect, which resembles both in consistence and structure a lymphatic gland in advanced fibrous degeneration. The steps which lead to this result are as follows: We have already seen how all the tubular organs in the portal canals lie in a network of transparent intermediary substance continuous with that which forms the adenoid reticulum, and that in the early stage of disease this network becomes coarser and more distinct. It is very difficult to trace this structure into the acini, so long as their condition is unaltered; but . . . as soon as the tissue of a lobule becomes affected by tuberculous disease, the existence of such a framework becomes obvious; and that the first change by which the encroachment of the interlobular new growth of the glandular tissue is indicated consists in the development of transparent bands or threads, in the interlacing of which the capillaries and liver cells gradually become involved. The arrangement of these bands is such, that in proportion as they become thicker and stronger the affected tissue is converted into a fibrous-looking meshwork, in the holes of which the original elements are imprisoned. In this way the liver cells become broken up into masses which are separated from each other by septa of transparent material. Hence two results follow—on the one hand the capillaries collapse and lose themselves in the trabeculæ of the newly-formed stroma, while on the other the liver cells, which at first struggle for existence with adventitious cellular elements in the loculi of the stroma, finally waste away, the nucleus often remaining after the body of the cell has disappeared. . . .

The final stage of the process is easily described. All cellular elements disappear excepting a few scattered lymph corpuscles. What remains is a fibrous network in the arrangement of which that of the tissue which it has supplanted may still be traced. In other respects it resembles the corresponding structures which we have already studied in the spleen and lymphatic glands. Thus it appears that the adventitious adenoid pulp of the liver is liable to a process of fibroid degeneration which corresponds in all its important features to that which affects the natural tissue in those organs of which it forms the essential constituent.]

4. *Appearances observed in the Spleen.*

The morbid appearances observed in the spleen as examined with the naked eye are of the following nature. The organ may be enlarged without appreciable change of structure, or may at the same time exhibit on section disseminated miliary grains which appear to be Malpighian corpuscles. More frequently there is evidence of new growth in the form of rounded projections of its external surface, the pale whitish grey colour of which contrasts strongly with the natural redness of the organ. These nodular prominences vary both in size and arrangement.

In its natural state the spleen of a guinea-pig is about half an inch long, and weighs from half a gramme to a gramme, that is, about one-thousandth of the weight of the body. In inoculated animals its size and weight are enormously increased. Thus in ten cases of well-marked disease the average weight was found to be 1·1 per cent., that is more than ten times its weight in health. The heaviest spleen observed weighed 9½ grammes, that is 27 times its natural weight. Another weighed 8 grammes, and measured more than two inches in length. The organ was enlarged with or without structural alteration in 20 out of the 21 animals. In the exceptional case its weight was normal. As, however, the animal died in my absence, and was not examined by myself, I cannot state positively that it was not diseased.

In nine of the 21 infected animals there was a simple enlargement without appreciable change of structure. In two of these no granulations could be distinguished, the sectional surfaces appearing homogeneous. In the rest they were obvious, but their size scarcely equalled that of a millet seed. By microscopical examination I was unable to detect any structural peculiarity. Of five of these enlarged but otherwise healthy spleens the respective weights were 3·1 grammes, 5·6, 6·3, 8·3, and 9·5 grammes. The other two were not weighed, but one of them measured nearly two inches and a half in length.

In nine animals the external surface of the spleen was beset with miliary nodules, which projected considerably, and on making sections it was found that similar rounded masses were scattered throughout the organ. These nodules possess a very firm consistence, and have the characteristic semi-translucent appearance of grey tubercle, so that a section of the organ has a striking resemblance to a section of hyperæmic and airless human lung beset with miliary granulations. On cutting into them it is found that the smaller nodules are transparent throughout, but that each of the larger ones exhibits a central opacity. They are surrounded by the natural tissue, which exhibits no appearance of hyperæmia, and can be readily enucleated from it without carrying with them any adhering spleen pulp.

In two of the animals the nodules were of the same general character, but instead of being disseminated throughout the surface and substance of the organ they were aggregated in groups in different parts. Each of these groups gave rise to a circular projection which assumed a form similar to the so-called tubercles which are met with in cancerous disease of the human liver. In all of them the margin was more prominent than the centre. On making sections of these tuberosities, each was shown to be due to a mass of the same semi-transparent material as that which formed the smaller nodules. Most of them projected on the external or convex side of the organ. As, however, their diameters were equal to its thickness, they could also be felt and seen on its concave aspect although they were not so prominent. The sectional surfaces were irregularly mottled with transparent white, opaque yellowish white, and red; the first being most abundant towards the circumference of the nodosity, the second in the central parts—a fact which seemed to indicate that each tuber is produced, not by the extension of a single nodule, but by the growth of a number of nodules round a previously existing central mass. The sections further showed that in these animals the white material was not separated from the healthy structure by so circumscribed a line as in those cases in which the deposit assumed a nodular form. For this reason the masses could not be readily enucleated. . . .

Microscopical Dissection.—In my examination of the nodules in the recent semi-transparent condition which is most frequently observed, I have been unable to detect any characters by which their elements can be distinguished from those of the Malpighian corpuscles. I have, however, obtained no evidence that they actually originate from previously existing Malpighian bodies, or that they have any connection with arterial branches. The structure which they exhibit is strictly analogous to that of the adenoid growths already described, and particularly to those which are found in the liver. Fine sections show that each nodule consists of cellular elements embedded in the holes of a vesicular matrix. The paleness of the whole mass is owing to the absence of those venous dilatations to which the spleen owes its peculiar colour, and especially of the blood pigment granules which the sinuses contain in considerable number. In nodules which are opaque in their centres the microscopical appearances resemble those observed in the central softenings of the pulmonary nodules. The change which the opacity indicates is due to the breaking up of the nuclei, and the existence around and among them of innumerable fat granules. In several instances I have found, in making sections of nodules with opaque centres, that the degeneration was not only fatty but calcareous. Under the microscope the calcareous deposi had the form of angular or botryoidal grains. On the additio of dilute hydrochloric acid to these masses they disappeare with effervescence, leaving a granular fatty detritus behin them.

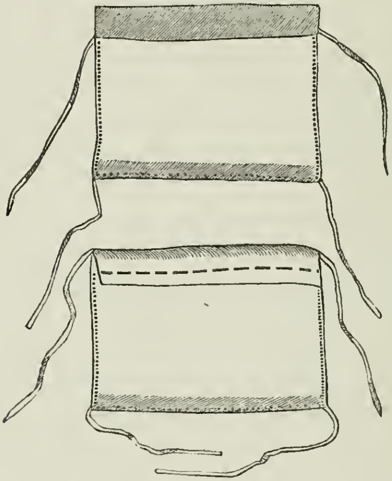
In the formation of nodules in the spleen, as in the lymphatic glands, we have an example of a process which seems to stand midway between hypertrophy and new growth. The original structure of the nodule cannot be distinguished from that of the tissue in which it originates, *but its development is different.* Normal in its anatomy, it proves itself to be morbid by undergoing fatty degeneration and necrosis.

(*To be continued.*)

HOW TO MAKE A POULTICE.

BY THE EDITOR.

At first sight the title of this paper may seem to many of our readers absurd, and the idea that medical men require any instruction in making a poultice preposterous, but we have been led to write it from seeing that many students and some practitioners do not distinguish between the proper methods of making a poultice for surgical and for medical use. Many, perhaps most, students spend a great part of their four years' curriculum in surgical study, and devote a comparatively small portion of it to medicine. This may partly be the reason why they do not learn the best ways of making poultices for the relief of internal pain: but another reason is, that in hospitals poultices are made in certain ways for the sake of cleanliness and economy, and these ways are not always the best possible for private patients, although they may be the best under the conditions which obtain in hospitals. Every one knows the relief which a poultice affords when the finger is inflamed, and has noticed how the painful throbbing diminishes after its application. Most people have noticed also that dipping the finger in cold water has a similar action, and it seems strange to many that the opposite conditions of heat and cold should have a similar effect. The reason probably is that both heat and cold lessen the force of the impulse with which the blood is driven through the dilated arteries of the inflamed parts against the block which exists in the capillaries. Cold causes the afferent arteries to contract, and lessens the impact of the blood by diminishing the quantity sent to the inflamed part; a poultice lessens the impact by dilating the capillaries surrounding the seat of inflammation and affording a ready side outlet into the veins. In surgical cases we usually use the warmth and moisture of the poultice to act directly on the surface. We therefore make the poultice with crushed linseed or with linseed meal and oil, spread it on some tow and apply it to the skin without anything intervening. But useful though this method may be for wounds, ulcers, and abscesses, it is not the best form of application in cases of inflammation of the thoracic or abdominal viscera, or where spasm is present without inflammation. In such cases we may, no doubt, do some good by applying the poultice to the surface exactly as in surgical diseases. We may draw off some of the blood to the surface; and we may also exercise a reflex action through the nerves upon the vessels of the inflamed organ below, but this will not be so great if we influence the surface only, as when we allow the heat to penetrate to the inflamed or irritated organs themselves. If we apply the poultice directly to the skin it must be allowed to become tolerably cool before the patient can bear it, and thus half its advantage is lost. In order to relieve spasm, as in colic—intestinal, biliary, or renal; to relieve inflammation of the pleura, the lungs, the liver, or other organs, we want to apply the poultice as hot as possible, while we protect the skin from being scalded.


The upper figure represents the bag empty; the lower one the bag filled and sewn up.

In order to do this, a flannel bag should be prepared, a convenient size being twelve inches by eight; this should be closed at three edges and open at the fourth; one side of it should be about one inch or one inch and a half longer than the other, as represented in the diagram, and it is convenient also to have four tapes attached at the points which form the corners when the bag is closed, in order to keep the poultice in position. Besides this, another strip of flannel should be prepared of the same breadth as the length of the bag, and long enough to wrap round it once or oftener. Crushed linseed, bowl, and spoon should then be got together, and the spoon and bowl thoroughly heated by means of boiling water; the poultice should then be made with perfectly boiling water, and rather soft. As soon as it is ready, it should be poured into the bag, previously warmed by holding it before the fire; the flap which is formed by the longest side of the bag should now be turned down and fastened in its place by a few long stitches with a needle and thread, it should then be quickly wrapped in the strip of flannel (also previously warmed), and fastened *in situ*, if necessary, by means of the tapes. It may be covered outside with a sheet of cotton wool. In this way the poultice may be applied boiling hot to the skin without burning; the two layers of flannel which are at first dry allow the heat to pass very gradually indeed to the skin; as the moisture of the poultice soaks through them, they become better conductors, and the heat passes more quickly, but the increase is so gradual as not to cause any painful sensations whatever, but only one of soothing and comfort. The poultice also naturally keeps much longer hot, and the necessity for changing it arises much less frequently.

The difference between the effect of a poultice made in the ordinary way, and in the manner just described, is sometimes exceedingly striking. It is, perhaps, less marked in cases of inflammation than in those of spasm. We have seen a patient suffering from intense abdominal pain at once relieved by a poultice made in the way just described, although a succession of poultices made in the ordinary way had been utterly useless. This way of making poultices is one of the minutiæ of medical practice; apparently extremely trivial, but really, we believe, very important. The relief which we have seen afforded by poultices made in this way, and the knowledge that *some* practitioners at least are ignorant of the method, must be our apology for drawing attention to such a trivial detail.

Reviews.

Sarcoma and Carcinoma, their Pathology, Diagnosis, and Treatment. By HENRY TRENTHAM BUTLIN, F.R.C.S. With 4 plates, 8vo. pp. 202. London: 1882.

PROBABLY no short title could have been found to indicate the precise scope of Mr. Butlin's book, but it may be fairly urged that the title "Sarcoma and Carcinoma" is too comprehensive from the point of view of a library catalogue. In the first place, the great physiological and pathological questions which naturally arise about the two chief classes of tumours, such questions as occupy the first five chapters of Virchow's great work, are passed over by Mr. Butlin with somewhat too severe a silence. The recording and collating of cases "with remarks" is a recognised, though not the highest department of pathological work. The work of the observer who will on no account permit himself to be influenced by a harmonising or illuminating idea has a value of its own, and some do wisely in preferring it. The same uncommitted manner is sometimes assumed by those who have watched the ups and downs of theory for a lifetime, and it is often more instructive to read between their lines than to follow the extended arguments of others. There is, however, not much reading to be had between Mr. Butlin's lines. Indeed we venture to think that his judgment on the burning questions of tumour pathology is in a somewhat inchoate stage. Thus, in a passage on cancer of the tongue, he says, "Here, I imagine, as in all similar cases, continuous extension of the disease is mainly influenced by the resistance offered to such extension, and by the liability of the invaded tissues to contagion:" the sentence is a neat expression of *each* of the two rival views that are held as to the nature and manner of cancerous infiltration. But Mr. Butlin destroys the illusion of his neutrality by a footnote on p. 169: "I am not at all inclined to accept this theory of 'epithelial contagion.'" Perhaps he is equally little inclined to accept the theory of diminished resistance; but if he is to withhold from us all guidance whatever on the subjects about which the profession is chiefly in want of guidance, we fail to see the exact aim he has in view.

The part of the work on Sarcoma is chiefly occupied with tumours of bone, that on Carcinoma with epithelioma of the tongue, and cancer of the œsophagus. The testis and tonsil afford illustrations of each variety of new growth. While the work is characterised by much accuracy of observation and precision of statement in those matters which belong to the catalogue department of science, we have noted on occasions some looseness or carelessness where other faculties are called upon. Thus the severe strictures passed upon the introduction of the term "osteoid"—it was Virchow who introduced it—rest certainly upon a misapprehension: "osteoid" refers neither to "true bone" nor to calcification, and certainly not to each of them in turn, but to the crude product of a defective bone-forming process. Again, "the inclusion of embryonic tissues in organised parts during the process of development" is *not* one of the theories that have been put forward to account for malignancy: it is Cohnheim's hypothesis of the origin of all primary tumours whether malignant or not, and the hypothesis is only indirectly, if at all concerned in the explanation of malignancy. The work contains careful tables of cases from the more recent literature, and four beautiful tinted plates showing varieties of minute structure in the sarcomas and cancers of the regions treated of. The pathological sections are supplemented by others on diagnosis, prognosis, and treatment. In two words the results may be summed up thus: prognosis *infausta*; treatment, resection.

On Concussion of the Spine, Nervous Shock, and other obscure Injuries of the Nervous System in their Clinical and Medico-legal Aspects. By John Eric Erichsen, F.R.S., Surgeon Extraordinary to the Queen, &c., &c. A New and Revised Edition. Crown 8vo. pp. 344. London: Longmans, Green, & Co. 1882.

The reader of this volume cannot but regret the extreme scarcity of post-mortem examinations carefully made in accordance with the scientific requirements of the present day. Yet the author has published everything of this kind which has come to his knowledge; and, if his explanation be correct of the difficulties with which pathology is here beset, it may be many years before the clinical conditions which are described by him are associated with their corresponding morbid changes. Clinically, the book is full of interest, both on account of the admirably recorded cases it contains, and for the grouping of the symptoms and the deductions which may be drawn from them. Great care is taken to point out that the effects of railway injuries do not differ in any essential respect from the effects of other injuries—a very important point, inasmuch as there has been a strong tendency to specialise the results of railway injuries.

We heartily wish that the excellence of Mr. Erichsen's work may produce an appreciable effect on the evidence of medical witnesses in law-courts in the immediate future, but we can scarcely hope that this will be so, unless, indeed, his suggestions for the appointment of medical assessors be adopted. It is not improbable that these suggestions may by and by receive the attention they deserve, for a somewhat similar course has just been adopted for medico-legal cases in which chemical analysts are required. By this means, and by this means alone, we believe, will the opprobrium which now rests on medical witnesses be removed.

Foods: Their Composition and Analysis. By A. WYNTER BLYTH, M.R.C.S., F.C.S. Crown 8vo. pp. 586. Illustrated. London: Charles Griffin & Co. 1882.

MR. BLYTH has divided his former volume on analysis into two distinct treatises, the present one on foods, the other on poisons. This book aims at covering a wide range. It embraces a dissertation on the history of adulteration from Hiero's time downwards; a digest of legal cases and statutes relating to adulteration and the sale of drugs; a glance at the historical evolution of food-analysis; and a description of special forms of physical and chemical apparatus, from mercury-pumps to spectroscopes, used, or likely at some distant future to be used, by the public analyst. All this is preliminary to the subject proper; when at last the author reaches this his work is of very high quality. The monograph on milk is remarkably full and clear, and in almost all points unexceptionable. The chapter on water-analysis is well up to date, without however solving the difficulties which still attach to the interpretation of analysts' results.

As a work of reference on the composition and adulterations of common articles of consumption there is much to praise in Mr. Blyth's book. We can believe that to many the frequent excursuses which diversify it will add to its interest without taking away from its handiness. But the index much needs further attention if it is to be of use for only occasional reference.

Ringworm: its Diagnosis and Treatment. By ALDER SMITH, M.B. Lond., F.R.C.S. Second Edition. London: Lewis.

THAT Mr. Alder Smith's book on ringworm should have already reached a second edition is evidence that it supplied a want in contemporary medical literature. We can only repeat what we said in reviewing the first edition, that the work is eminently practical. The present issue is enriched with two additional plates, and contains full information regarding the most recent suggestions for the treatment of the disease.

A Practical Treatise on the Diseases of Children. By J. FORSYTH MEIGS, M.D., late Physician to the Pennsylvania Hospital, and WILLIAM PEPPER, M.D., LL.D., Provost and Professor of Clinical Medicine in the University of Pennsylvania. Seventh Edition, Revised and Enlarged. 8vo. pp. 1055. London: H. K. Lewis. 1882.

A WORK in its seventh edition scarcely calls for review. The present issue of a treatise well and favourably known on this side of the Atlantic as well as on the other is distinguished from its predecessors by several new features. The chief of these is an excellent and very practical article on food for infants. The advantages and disadvantages of condensed milk as a substitute for breast-milk are clearly detailed. The grounds for the opinions expressed, chemical, physiological, clinical, and experimental, are fairly given, so that any one inclined to study the matter can check and verify the conclusions for himself. On the whole, the authors incline to think that it is less upon the milk-solids of condensed milk that infants fed upon it have to live than upon the cane-sugar it contains. At the same time no word is said in favour of the numerous and loudly-vaunted "farinaceous" foods: some note of warning against the most of them would have been well-placed and well-timed. A short but in its way complete article on Rötheln is also new; it sums up well our still scanty knowledge of the disease.

The feature of the book which has given it its wide success among practitioners is the special and ungrudging attention given to the therapeutics and the *minutiæ* of treatment. Such *minutiæ* often play the major part in successful and beneficent practice.

Clinic of the Month.

Neuroses associated with the Vagus Nerve.—After noting the frequency of cardiac irregularity from indigestion, Dr. Rosenbach records a case of cardiac irregularity caused by the horizontal posture, and a case of temporary central paralysis of the vagus nerve. The patient in the first case was a prematurely old man, aged 55, who complained that, so soon as he lay down in bed, he had a feeling of præcordial anxiety, and usually awoke in great distress, with the hands cold and stiff. With the exception of slight anæmia, some signs of arterial sclerosis, and a slight emphysema, there was nothing abnormal in his condition. The digestive functions were normal. His pulse in the erect posture was 72, regular, and moderately full; but, on his resuming the recumbent posture, with the head low, it fell to 60 or 64, and became irregular and intermittent, all which characters disappeared almost immediately on his assuming the erect posture again. Dr. Rosenbach, considering that he had excluded all other possible causes, attributes this phenomena to the change in the outflow of blood from the cranial cavity. This outflow being much less free in the horizontal than in the erect posture, as shown by the more rapid current in the veins at the root of the neck when the erect posture is assumed, he considers that in a patient with arterial sclerosis the tonus of the vagus and of the vaso-motor nerves produced by the venous blood will cause retardation of the heart's beat, with increased arterial tension. The patient in the second case was a man, aged 31, affected with phthisis. While in hospital, he was attacked with vertigo and headache, his pupils being extremely narrow. Two days later he became insensible, breathing once, or at most, twice a minute, while at the same time the heart was extremely frequent and tolerably full. Under artificial respiration, carried on for an hour and a half, the patient recovered. Each time the artificial respiration was stopped, the patient again ceased to breathe, and became cyanotic. That the vagus could still conduct impulses, was shown by the fact that electric stimulation with a strong current reduced the heart's beats from 156 to

100 or less, per minute. After the above period, Cheyne-Stokes's respiration set in, and for two hours longer the patient required to be roused occasionally. A month later, the patient died of tubercular meningitis. Dr. Rosenbach puts down the symptoms in this case to a central paralysis of the vagus, owing to a disturbance of nutrition in the respiratory centre of the medulla oblongata. (*Deutsche Med. Woch.*, No. 12, and *Lond. Med. Rec.*, June, 1882.)

Treatment of Chronic Abscesses by Injections of Alcohol.—M. Assaky reports fourteen cases of chronic abscess treated after Professor Gosselin's method. This method consists in the injection of alcohol, and is based on the antiseptic properties of this agent, and its action on inflamed or suppurating tissues. An incision about a third of an inch in length is first made, and the abscess-cavity, after its contents have been discharged through this opening, is washed out with alcohol of 90 deg. strength. The quantity of injected alcohol varies according to the dimensions of the abscess. It is necessary that the quantity be sufficient for application to the whole of the internal surface of the cavity. The seat of the emptied and injected abscess is then covered by a dressing of camphorated *eau-de-vie.* On the following day there is an abundant secretion of dark-coloured and thick fluid. The secretion diminishes in quantity from day to day, and, as it diminishes, its density becomes lower, and its colour lighter. In the ultimate stage of the treatment it presents a serous transparent fluid resembling lymph. When, on pressure, this serous fluid only can be forced out, and in small quantity, the abscess is on the point of becoming healed, there is no longer any cavity, the walls are adherent to each other, and there remains but the small incision, which closes in the course of two or three days. This method, M. Assaky states, has the following advantages: it necessitates only a small wound of the integument, and so there is less risk of the ordinary complications of wounds, and the cicatrix is small and is hardly apparent The superiority of the method, however, consists chiefly in the considerable abridgment it effects in the duration of the treatment of chronic abscess. It is very evident, M. Assaky states, that the number of days occupied in the healing of an abscess by this method must depend on the extent of the sac. But all other things being equal, the duration of treatment, in a case of abscess punctured and injected after Gosselin's method, is much less than that of one submitted to ordinary methods. In small abscesses, and those of medium size, cure may be effected between the second and seventh days. This treatment may be applied to any chronic abscess that is circumscribed, and consists of one regularly shaped cavity. In most cases, one injection only of alcohol is necessary; but when the abscess is very large, two or three may be required. The indication for a repetition of the injection would be a persistent purulent discharge. The injection of alcohol into the inflamed tissues, it is asserted, is not very painful. The pain varies with the sensitiveness of the patients. One will complain of lancinating pains, and of burning or pricking sensations which will last from ten minutes to an hour, whilst another will not complain of any painful sensation. Sometimes, though rarely, the injection of alcohol is followed by more or less extensive sloughing of the skin. This result has seemed to M. Assaky to have been usually associated with too long delay on the part of the patient in applying for treatment, so that the seat of the abscess has become much inflamed, and the skin hot, red, and very tense. Associated with this condition, there may be a further cause in some faulty diathetic condition of the patient. (*Gaz. Méd. de Paris,* Nos. 6 and 7, 1882, and *London Med. Rec.* June, 1882.)

Lycoperdon as a Hæmostatic.—Dr. E. Thompson, of the Tyrone Infirmary, writes to the following effect:—Some months since, I directed attention to the use of the puffball as a hæmostatic and surgical dressing. My attention was first directed to this substance in the case of a poor woman who had suffered for a long period from an open cancer of the right breast. I visited this patient, and ascertained that she had tried almost every form of surgical dressing without being in the least relieved either of her sufferings or the constant hæmorrhages which weakened her. In despair she sought the aid of a country quack, who suggested the use of the puffball, or *lycoperdon giganteum,* which grows close to the roots of trees in some of our woods. From the day the patient commenced the use of this substance her sufferings were greatly mitigated, and she improved in health and strength. The frequent bleeding ceased, and the foul odour from the sore was greatly diminished; and the poor woman lived in comparative comfort for seventeen years after the first appearance of the cancerous ulceration. The puffball is a most soft and comfortable surgical dressing, and the powder it contains seems to possess antiseptic and anodyne properties. When mature and fit for use it is almost as large as a man's head; it is enclosed in a thin capsule which must be removed, it can then be torn in pieces and used either as a styptic or for applying any required surgical dressing. It is, however, its hæmostatic properties that seem to me to be so especially valuable; it has the power of stopping instantly even the most violent external hæmorrhages upon which iron, matico, turpentine, &c., have been tried in vain. A leading surgeon in Belfast told me that when removing a large tumour from the neighbourhood of the orbit, he encountered a violent hæmorrhage from large arteries in the bone, which even plugging with pieces of wool failed to control; yet a small piece of the puffball at once restrained all bleeding. I have directed attention to this useful substance, whose value my own experience has assured me of, in the hope that some of our leading surgeons will try it, and ascertain for themselves its utility. (*Lancet*, July 29, 1882.)

Syphilis conveyed by Skin-grafts.—Another case in which syphilis was conveyed by skin-grafts is reported in Paris by M. Féréol. It occurred in the practice of M. Deubel; the patient was a man, aged forty-nine, who had not had any venereal affection, and who had a large wound caused by erysipelas with sloughing. Seventy-five dermo-epidermic grafts were put on, nearly all of which "took" and cicatrisation was rapidly effected. A month after the application of the first grafts the cicatrix began to ulcerate in several places. Six weeks later an abundant roseolous eruption broke out over the body, and a month after mucous patches appeared in the mouth. One of the sons of the man, who had furnished grafts on each occasion, then consulted M. Deubel for mucous patches about the anus, and stated that eighteen months previously he had had a hard chancre for which he had not had any treatment. The case is apparently beyond all doubt, and shows the necessity for caution in the selection of persons from whom grafts are taken. The safest rule to follow is, wherever possible, to take the grafts from the person on whom they are to be implanted. (*Lancet*, July 29, 1882.)

Etiology of Gastric Ulcer.—In the course of some experiments on the production of nephritis by the injection of cantharidin under the skin, Aufrecht has made the remarkable discovery that ulceration of the stomach may result from these injections. After the subcutaneous injection of cantharidin, suspended in oil to lessen the local irritation, he found in guinea-pigs a large number of circumscribed changes in the mucous membrane of the stomach. These were at first regarded as merely hæmorrhages, but on closer examination were found to be spots of loss of substance, the boundary of which projected above the level of the adjacent mucous membrane. These changes were especially conspicuous in the stomach of a rabbit, which died ten days after the injection of two and a half milligrammes of cantharidin. About fifteen small ulcers were found in the stomach, many of them with raised edges, and all filled with blod-clot. There were also six circular spots of a dull grey colour, sharply limited without any extravasation. A microscopical examination showed in the latter the following changes. The epithelium of the glands was paler and less granular than normal. Between the glands was a clear amorphous material; the capillaries were distended with blood, whereas elsewhere they were empty. A similar change was found in the vicinity of the extravasations, and the granular epithelium here presented irregularity. The extravasations were of uniform brownish-red blood, in which no intact blood-corpuscles could be seen. There was no sharp limitation to the blood effused, such as might have been expected had the hæmorrhage resulted from the rupture of one vessel. From these facts he concludes that the extravasation is the second stage in the process, consecutive to inflammation, which appears to be the first alteration. Aufrecht believes that these facts indicate that in man a similar sequence may obtain, and that ulcer of the stomach probably commences as inflammation, and not, as is commonly assumed, by hæmorrhage. (*The Lancet*, Aug. 19, 1882.)

Treatment of Malignant Pustule by Iodine.—Dr. Poladura, in *La Revista de Medicina y Cirugia Praticas*, relates the following case of malignant pustule, apparently cured by the hypodermic use of iodine. The patient was a shepherd, aged forty-one, of sanguine temperament and good constitution. Five days before he was seen he presented the local and constitutional signs of malignant pustule of the face. The treatment consisted in incisions, excisions, the actual cautery, and antiseptic and emollient applications. During the next two days following, the œdema and induration had attained such a degree as to constitute a veritable monstrosity; the temperature was 40° C., and there was vomiting and great prostration. Tincture of iodine was given internally, and antiseptic applications continued. Ten hypodermic injections of a two per cent. solution of tincture of iodine were administered around the zone of induration. Subsequently the symptoms became aggravated. Injections were again practised at various spots in the œdematous region. The next day the delirium, as well as the sweats and chills, had disappeared, and the pulse was stronger. An inflammatory circle was visible at the margin of the eschar. Treatment being continued, a cure resulted. (*Rev. de Ciencias Med.*, June, 1882.) [*Pract.* xxvi. 460.]

The Nervous Symptoms of Myxœdema.—From a careful study of this subject, Dr. W. B. Hadden concludes:—1. That in the early stages myxœdema is essentially a disease of imperfect nutrition, dependent probably on generalised angiospasm. 2. That the solid œdematous condition of the skin and connective tissue is due to a form of lymphatic obstruction, which may also be ascribed to vaso-motor influence; and that the accumulated products undergo changes which result in the formation of mucin. 3. That the condition of the thyroid gland is also to be explained on the vaso-motor hypothesis. 4. That the more severe mental symptoms, such as insanity, occurring in the later stages of myxœdema, are due to alterations in the brain itself. 5. That, although myxœdema is a distinct morbid entity, it is probably intimately allied to certain other disorders, such as sporadic cretinism and scleroderma. 6. That the solid œdema, which is universal in myxœdema, may be localized in various parts of the body, such as the tongue and extremities. 7. That the primary and essential lesion probably exists in the peripheral sympathetic system, and perhaps, too, in the supreme centre in the medulla oblongata, this last supposition being based on the occasional occurrence of bulbar symptoms in myxœdema. (*Brain*, July, 1882.)

Spontaneous Rupture of the Rectum.—A recent number of the *Revue de Chirurgie* contains an interesting article on the above rare occurrence, by M. E. Quénu. The author applies the term "spontaneous" to cases of rupture, in consequence of simple muscular effort, of all the coats of an apparently healthy bowel. The first case of the kind was published by our own countryman, Sir B. Brodie. M. Quénu has collected six others, one of them having been observed by himself in the clinique of Professor Richet. The records are not all equally complete. In four out of five in which information on the point is given, there was old and well-marked prolapse of the rectum. The rupture was always produced during an effort—four times during defæcation, once during vomiting, once while lifting a heavy weight, and once in consequence of the patient's straining while the surgeon was endeavouring to reduce a prolapse of the rectum. Excepting for rectal prolapse, the patients were well prior to the rupture. The rupture in each case took place suddenly, at the moment of effort. The patient felt acute pain in the belly with general malaise, and perceived a voluminous mass protrude from the anus. Sometimes the protrusion was preceded by hæmorrhage. The general condition quickly became worse, the face pale and Hippocratic, the voice feeble, the extremities cold; the intellect remained clear. Disappearance of the prolapse immediately followed the protrusion of intestine. The straining of the patient quickly caused the expulsion of more intestine, which formed a mass hanging between the thighs, and soon became congested and inflamed. When examination is made in such cases, the relaxed sphincter commonly offers no obstacle to digital exploration and the pedicle of the protruded swelling can be followed up to the rent in the bowel, unless the latter should be too high up to be reached.

The only treatment at all likely to be of service, of course, is the reduction of the mass. This is very difficult. In two cases laparotomy was performed and the bowel pulled up. In another the protruded intestine was opened and evacuated of fæces and flatus. After the protruded intestine has been reduced, the rent in the rectum should be sutured. If it be possible to reduce the intestine *per rectum*, the laceration may possibly be also sewn up in the same way; or the rectum, if previously prolapsed, may be pulled down and then stitches put in. We would remark, with reference to this proceeding, that in the present day laparotomy is not so dangerous a proceeding as it was in the days when some of the cases which M. Quénu quotes occurred; and hence that probably now, in the presence of so grave an accident, few surgeons would hesitate to open the abdomen, pull up the prolapsed bowel, and suture the wound. To elucidate the pathogeny of this accident, M. Quénu has made experiments to ascertain the resistance which the rectum offers to a bursting force. Having stitched up the anus, he pumped air into the rectum, measuring the pressure. He found that the rectum would bear, without giving way, a pressure equal to that of a column of mercury sixty centimetres high (about twenty-three inches). When the pressure passed that of seventy centimetres, the peritoneal coat began to crack, and the other coats followed. We may add, that Schatz has shown that the ordinary pressure within the rectum is equal to that of a column of mercury from twenty-five to thirty centimetres high, and that it sometimes rises to that of fifty centimetres of mercury. He also tried by forcing injections into the veins to rupture the rectum; but the anastomosis was so free that this result did not happen, and moreover, at a pressure of forty to fifty centimetres, the vein burst in the meso-rectum. The explanation which M. Quénu holds as probably correct, is that the rupture takes place in a bowel of which the veins are varicose, its walls congested by prolapse, and softened by infiltration of leucocytes and inflammatory effusion. He points out that in the three recorded cases of spontaneous rupture of the œsophagus, one occurred in an immoderate drinker, and the other two were preceded by vomiting of blood; from which he concludes that the condition of the œsophagus in them probably resembled that of the rectum in the cases under consideration. (*Med. Times and Gazette,* Aug. 5, 1882.)

Laminated Plaster Splints.—Mr. Furneaux Jordan, in a clinical lecture on these splints says:—"Take a few sheets of muslin, put them one over another, spread plaster of Paris between them, roll or fold up this 'layered' sheet in any convenient form, dip it in water a few moments, lift it out of the water and very gently squeeze it, spread it out neatly and smoothly, and you have a soft sheet of splintage ready for any purpose which splint can secure. This sheet may be little or big; it may envelop a finger or a limb, or the trunk and the head, or the trunk and the lower limb. It is simply drawn under the part and folded over it. The drawing under, the folding over, and the trimming by means of scissors, are the work of a time measured by seconds. The part is kept in one unaltered position by intelligent force until the sheet sets—a time measured by minutes. A firm, durable, and perfectly fitting splint is thus obtained, which may be left on for weeks or months. The laminated plaster splint is quickly and easily made. The surgeon first determines how much of the limb or trunk it is well to cover. A pattern is then cut. One of the layers of checked muslin does very well for this purpose, as it is stiff enough to keep its shape, and is easily marked with a pencil. Afterwards other pieces of muslin are cut off the same size and shape. Six or seven layers make a good average splint; three or four will do for a child; eight or nine may be needed for a heavy, restless, or delirious patient. The first layer is laid flat on the table and sprinkled with a stratum of good dry powdered plaster, which is smoothed over with a spatula or paper knife; on this with its margins corresponding, is placed the next layer of muslin, which, in its turn, is sprinkled with plaster. The process is repeated until all the layers are in place. The splint is then slowly and carefully folded or rolled up and kept dry, ready to be dipped in water when wanted. The water—let this be well understood—immediately passes through any number of layers of muslin and plaster, thoroughly drenching them both in less than sixty seconds. Hot water is recommended, and a flannel bandage, cotton padding, or a jersey should be placed next the skin. (*British Medical Journal*, July 15, 1882.)

Tubercle of the Heart.—Prof. Hirschsprung reports an interesting case of a girl eight years old, who was a healthy-looking child, but on admission to the hospital had serious symptoms pointing to the cardiac region, and represented by a tumultuous action of the heart, diffuse pulsation, increased cardiac dulness, slight cough, heightened temperature, and increased respiration. Dyspnœa and cyanosis set in, and the child died seven days after entering the hospital. A tubercle as large as a walnut was found in the internal wall of the left ventricle; a few miliary tubercles in the anterior part of the left upper lobe, and nowhere else in the lung; the bronchial glands, especially on the left side, were found in a state of cheesy degeneration, as were also the mesenteric glands; there were tubercles in the spleen and pericardium. The liver and spleen were enlarged, and the intestinal glands swollen but not ulcerated. (*Jahrb. für Kinderh.* xviii. 2 and 3.)

Cascara *(Rhamnus Purshiana)* **as a Laxative.**—Dr. Carter, of Liverpool, in an article on new therapeutic agents, writes to the following effect:—The fluid extract prepared from the bark of this shrub, or small tree, by Parke, Davis and Co. of Detroit, is an excellent remedy in chronic constipation. I have used it now for two years, and have no doubt of its value. I particularise the preparation of Parke, Davis and Co., in justice alike to those gentlemen, of whom it is right that I should say I know nothing except from an experience of the genuineness of their preparations, and to medical men who may feel inclined to prescribe the remedy. My reason for making what may seem an invidious selection is that a prescription made up apparently with a different preparation proved inert. First of all, however, it will be well to give a short account of the properties and action of the drug. The fluid extract is reddish-brown in colour, and extremely bitter. A very good method of prescribing it is in a mixture, with twice its quantity of glycerine, or one of the flavoured syrups. Of this, a fluid drachm should be given three times a day, and the dose be diminished as soon as its aperient action is developed. It is what may be termed a tonic aperient, and seems to produce an effect somewhat like that caused by belladonna and nux vomica united with an ordinary aperient. It evacuates the whole canal. The motion is not watery, but usually semi-solid, truly feculent in character, and voided without difficulty, and so far from causing subsequent constipation, the bowels will often act regularly after its use has been entirely discontinued. I have used it so extensively, and the testimony to its value is so unmistakable, that it would be difficult to select particular cases to prove this. The following, however, is fairly illustrative of the method of its action:—A young man, admitted to hospital suffering from bronchitis, was also the subject of chronic and severe constipation, which was a source of great trouble to him. Twenty minims of the fluid extract, with forty of glycerine, were ordered three times daily. This not acting, the dose was doubled on the following day. Five soft semi-solid motions were caused. The dose was immediately reduced to twenty minims. The bowels then acted three times. Again the dose was halved. In a day or two it was necessary to give the smaller dose twice a day, and two days later, once a day only. Shortly afterwards, its use was discontinued, the bowels continuing to act regularly during the remainder of his stay in hospital. (*Liverpool Med. Chir. Journ.* July, 1882.)

Extracts from British and Foreign Journals.

Hollow *versus* **Solid Stethoscopes.**—Dr. Lewinski has made a series of comparative experiments on hollow and solid stethoscopes, so made as to be in other respects exactly similar. He found that the hollow instrument gave quite a different sound to that heard at the same spot with the solid one. Comparing both sounds with that heard when the spot was auscultated immediately, that heard with the hollow stethoscope was manifestly more musical (as might be expected from the resonance of the hollow space): thus the vesicular murmur took on something of a bronchial character or became distinctly bronchial: while toneless râles became more ringing and clear. Obscure finely-vesicular râles, not to be made out at all with the naked ear, became in this way clearly perceptible. In the same way bronchial breathing and musical râles became fuller toned and approximated to the cavernous character. With larger instruments (such as are used by somewhat deaf persons) amphoric breathing could be heard over perfectly normal lung. On the other hand, the sounds heard with the solid stethoscope have less tone, and are more obscure and indefinite: this is referable to the loss of sound from repeated reflexion at the boundaries of the several media—chest wall, air, wood, and air again. As concerns the auscultation of the heart and vessels, no difference of practical amount was perceptible: slight differences in quality alone were observed. In conclusion, Dr. Lewinski places immediate auscultation highest, then that with the hollow stethoscope, provided its air-space is not too large. He strongly recommends the student to accustom himself to the use of one and the same instrument, as the sources of error are thus gradually appreciated and allowed for. (*Berl. klin. Woch.* No. 6, 1882.)

Diagnosis of the Cause of Sudden Unconsciousness.—Dr. R. O. Beard, after treating in detail the causation of sudden unconsciousness, sums up his conclusions in the accompanying table:

THE DIFFERENTIAL DIAGNOSIS OF

	CAUSES.	PULSE.	RESPIRATION.	TEMPERATURE.	PUPILS.
1	CEREBRAL CONGESTION.	Slow and full.	Slow and laboured. *Not* stertorous	Above normal.	Contracted with feeble reaction.
2	CEREBRAL HÆMORRHAGE.	Slow, full, often irregular.	Slow, laboured and stertorous.	1. Below normal. 2. Later regains normal. 3. Still later rises rapidly. (105–7°)	Variably unequal, insensible to light.
3	MENINGEAL HÆMORRHAGE.	Slow, full, and irregular.	Slow and stertorous.	Variable.	Variable, insensible to light.
4	CEREBRAL EMBOLISM.	Slow, weak and small.	Slow and full.	Slightly lowered.	Normal.
5	CEREBRITIS.	Rapid and irregular.	Shallow and irregular.	Higher than normal.	Unchanged.
6	SYNCOPE.	Rapid and thready or extinct.	Feeble and quiet.	Below Normal.	Dilated.
7	EPILEPSY.	Rapid, feeble and irregular.	Difficult, irregular, often gasping.	High (to 105° F).	At first dilated, later contracted. Insensible to light.
8	CATALEPSY.	Normal rate, but feeble.	Slow and regular.	Normal.	Dilated and very sensitive to light.
9	CEREBRAL HYSTERIA.	Small, feeble, but regular.	Rapid and quiet.	Normal.	Unchanged.
10	INSOLATION.	At first, slow and full. Later, rapid, feeble and frequent.	Rapid and slightly stertorous.	Very high. (104°-10° F.)	Contracted. Insensible to light.
11	URÆMIA.	Slow, feeble and irregular.	Slow and laboured with peculiar stertor	Progressively lowered.	Dilated and indolent.
12	ASPHYXIA.	Slow and feeble.	Slow, feeble and gasping.	Lowered.	Variable, usually contracted.
13	ALCOHOLIC INTOXICATION.	Small, feeble and frequent.	Slow and laboured. Sometimes stertor's.	Much lowered.	Contracted. Dilate under stimulation and again relapse.
14	OPIUM NARCOSIS.	Small, feeble and irregular.	At first frequent. Later superficial and slow.	Normal or slightly lowered.	Much contracted. Insensible to light.
15	CEREBRAL CONCUSSION.	Slow feeble and intermittent.	Feeble, sighing or almost extinct.	Below normal.	Unequal. React feebly.
16	CEREBRAL CONTUSION.	Slow and feeble.	Slow but quiet.	Normal or Slightly elevated.	Contracted. Insensible to light.
17	CEREBRAL COMPRESSION.	Slow, soft and irregular.	Slow, laboured and stertorous.	Variable, usually increased.	Dilated or unequal. Insensible to light.

CAUSES OF SUDDEN UNCONSCIOUSNESS.

MOTOR POWER.	INTELLECTION.	SENSATION.	SPECIAL SENSES.	COUNTENANCE.	MISCELLANEOUS.
Partial paralysis. Reflexes impaired.	Wholly or in part lost	Impaired.	Partially Impaired.	Flushed or Cyanosed.	Venous distention of face and neck. Retinal engorgement.
Hemiplegia. Reflex action abolished.	Completely suspended.	Entirely lost.	Impaired.	Variable.	Sphincters relaxed or paralyzed. Deglutition impaired. Ptosis frequent.
Paralysis more or less general. Reflexes unimpaired.	Suspended.	Anæsthesia accompanying paralysis.	Somewhat Impaired.	Variable.	Sphincters relaxed. Vomiting usual.
Hemiplegia, usually right-sided. Reflex action normal.	Transiently suspended.	Partially lost.	Normal.	Pale.	
Muscular relaxation. Slight convulsions. Reflex action suspended.	Suspended.	Hyperæsthesia.	Unimpaired.	Variable.	General evidences of inflammation.
Muscles relaxed. Reflexes unimpaired.	Suspended.	Impaired.	Impaired.	Very pallid.	Cardiac and venous murmurs.
Convulsions. Reflex action somewhat impaired.	Suspended.	Lost.	Unimpaired.	Pale. Ashen hue.	Eyelids tremulous. Eyeballs prominent. Tongue bitten.
Muscular rigidity. Reflexes disturbed.	Suspended.	Impaired.	Partially Impaired.	Pallid.	Retinal anæmia. Eyelids tremulous.
Normal.	Partially Suspended.	Blunted.	Somewhat Impaired.	Natural.	Spasmodic movements of eyes and eyelids.
Muscular relaxation. Reflex action feeble.	Completely Suspended.	Impaired.	Impaired.	Variable.	Skin harsh and hot. Vomiting and purging.
Epileptiform convulsions. Reflex action feeble.	Suspended.	Impaired.	Impaired.	Pallid.	Anasarca. Urinous odour of breath. Albumen and casts in urine.
Convulsions. Reflex action impaired.	Suspended.	Impaired.	Disturbed	Turgid.	
Muscular relaxation. Reflex movements suspended.	Suspended.	Complete Anæsthesia.	Impaired.	Variable.	Odour of Alcohol on the breath.
Complete muscular relaxation. Reflexes abolished. Conv'ls'ns in morphia poison'g.	Suspended.	Impaired	Impaired.	Pale and shrunken. Sometimes livid.	Odour of opium on breath. Vomiting. Secretions arrested, except that of skin.
Muscles weak and flaccid. Reflexes impaired.	Suspended.	Entirely lost.	Act feebly.	Very pallid.	Surface cold. Vomiting frequent. Paralysis of bladder and sphincters.
Muscular rigidity. Slight facial spasms. Paralysis of eyelids. Reflexes impaired.	Suspended.	Impaired.	Impaired.	Pale.	Sphincters relaxed.
Hemiplegia. Reflexes abolished.	Suspended.	Entirely lost.	In abeyance.	Very pale.	Deglutition impossible. Sphincters paralysed. Retention of urine.

—(*Chicago Med. Journ. and Examiner*, June, 1882.)

The Significance of Koch's Discovery.—In a recent letter to the Berlin Reichsgesundheitsamte, Professor Billroth discussed some of the practical aspects of Koch's discovery. He pointed out how the accumulating knowledge of the coarser pathological relations of tubercle have led to the conviction that the discovery must shortly come, and he paid a tribute to the investigations of Villemin as having constituted the first and greatest step in the discovery—the step of demonstrating that tubercle is inoculable. This proved its dependence on a transferable virus, although we are only now able to eliminate the possibility that the virus might be of simply chemical nature. The various degrees of individual proclivity to suffer, observed in man, render it very important to study the variations of proclivity which are observed in animals. As a rule it appears that the carnivora are less susceptible than the vegetable feeders (an unpleasant fact, by the way for vegetarians). In the case of man, the only safeguard is the normal unsuitability of the soil, apart from the existence of inherited fitness. But another reason why local tubercle often exists without general infection—why, for instance, scrofulous caries of a rib so often exists without a general infection—is due to mechanical conditions. At the periphery of such a tubercular focus, in a bone or a lymphatic gland, there is an induration which probably hinders the exit of the tubercular organism and its passage into the blood current. The necessity of a high temperature, such as that of the blood, for the growth of the organism, probably lessens very much the extent of the disease in man, since, if the germs could develop out of the body, they would probably be ubiquitous. While the discovery of Koch raises even into greater importance than before the inherited predisposition, it will probably lead to some modification of our views as to the influence of that predisposition. Cases may be due to infection which are regarded as the result of inheritance only. A consumptive mother, for instance, may infect a child through a pocket-handkerchief; moreover, the germs may be received by eating the flesh of infected animals. Certainly the conclusions are sufficiently probable to make it incumbent on us to treat consumption as in a measure an infectious disease.

Atropine as a Cause of Glaucoma.—Atropine has of late years been so widely used in ophthalmic practice, both in the treatment of various painful affections, and also for the purpose of paralysing the pupil to facilitate the estimation of errors of refraction or an examination with the ophthalmoscope, that a warning in its use by Mr. Streatfeild and Mr. Snell has not been sounded too soon. From their evidence, and that of other competent judges, a strong solution of atropine (such as the B.P. solution) is capable of producing glaucoma in some cases. A way to avoid the danger is pointed out by Mr. Streatfeild, who remarks that a solution much weaker than that of the pharmacopœia would produce sufficient mydriasis for all ordinary purposes. Dr. Ringer has, we believe, made some experiments on this subject, and has found that a dilatation of the pupil lasting some hours can be produced by a solution containing what a chemist would consider a mere trace of atropine. A solution formed by diluting the pharmacopœial "*liquor*" with two or three hundred times its bulk of water would be sufficiently strong. (*Brit. Med. Journ.*, July 29, 1882.)

Experimental Physiology and Practical Medicine.—Dr. G. F. Yeo has just delivered a course of lectures at the Royal College of Surgeons on the above subject. We commend them very heartily to those of our readers who are not clear as to the relation of modern rational practice to modern experimental science. As a sample of their scope and method we extract the following very instructive passage: "Not long since I found a policeman examining a poor woman who was said to have had a 'stroke.' She lay speechless and motionless on a door step; she showed no signs of convulsions, no stertorous breathing, no frothing at the mouth. So the policeman hesitated to make a diagnosis, thinking, no doubt, that other causes besides a 'stroke' might give rise to such a want of muscular irritability. Gently shaking her had no effect, but on his applying some form of stimulus to the finger she showed signs of returning consciousness, and the *left* leg and arm moved slightly. The right eye remained partly open, the other was closed; when the eyelid was raised, so as to expose the pupil to the sunshine, some movement of the muscles of expression was observable, but only on the left half of the face, to which side the mouth was slightly drawn. This became more obvious when some drops of cold water were thrown at her. The pulsation of the temporal artery was visible. Putting my ear to the top of her chest I found the heart beating violently, and heard a prolonged blowing noise instead of the sharp clear tone of the second heart-sound. Without much effort my thoughts had passed from the pulsating temporal artery to the heart, and from the imperfect aortic valves to the middle cerebral artery, where I fancied an embolus must be impacted. I told the policeman the woman had better be taken to a hospital, which was done accordingly. How was it that I was able confidently to advise the policeman about this poor woman, though he was no doubt very experienced in that sort of cases? What aid did experimental inquiry give me in arriving at my conclusion? Well, in the first place, I knew that the paralysis was restricted to voluntary movements, without the motions belonging to organic life being in the least interfered with. Vivisections of the earliest times informed me that this was quite possible as a result of some injury of the nerve centres, and experiments of more recent date enabled me to exclude a large part of these centres from being the seat of the lesion. That there was no local injury of the spinal cord in the dorsal region I knew, both from the loss of consciousness and from the fact that the reflex action of the lower limbs was not intensified, and vivisections informed me they would have become so had this been the case. I could see by the movement of the left leg that only one side of the body was paralysed; and then the look of the face distinctly showed that part of the seventh cranial nerve, which Charles Bell's vivisections taught me to know to be motor in function, was paralysed. This fact, together with the ready reflex action of the eyes and the sound side of the face, which I knew by vivisection required unimpaired sensory nerves, showed me that it could not be a case of profound toxæmia such as the policeman supposed to be possible. I knew by vivisections performed by many English physicians and physiologists, some of whom are still among us, that the second heart-sound depended on a certain action of the aortic valves. Not hearing the familiar sound, I concluded that the aortic valves must be diseased. Experiments on living animals concerning coagulation of the blood within the vessels informed me that when the lining coat of a blood-vessel, or the heart, is diseased, little clots are often formed at the diseased or injured part. I knew, further, from Virchow's classical experiments on living animals, that emboli introduced into the arterial blood-current often become impacted in the middle cerebral artery, and that the embolic blocking of a brain-artery, by shutting off the blood from the area it supplied, caused a sudden arrest of function of the part. Although the nerves going to the various paralysed muscles arise from very different regions of the cord and brain, I know by vivisections that there is a part of the cortex of the brain the injury of which would cause them all to be powerless. Clinical observation and pathological anatomy would have informed me that it was probably a brain lesion; but had it not been for the light thrown by vivisection on the few facts I was able thus hurriedly to observe I should not have been much wiser than any other bystander, and could only have agreed with them that it was a 'stroke' of paralysis." (Report in *Lancet*, July 29, 1882.)

Koroniko in Chronic Dysentery.—Dr. J. Jardine, writing from Kiukiang, in the *Chinese Imperial Maritime Customs Medical Reports*, says that dysentery, acute and chronic, was very prevalent in that community during the autumn of 1880. Acute dysentery had generally become sub-acute or chronic before the patients applied at the hospitals, so that the chronic form had generally to be dealt with. "As every one knows, these are the difficult cases to influence speedily by drugs, and with the Chinese a change of air or sea voyage is beside the question. In these cases I was induced to try koroniko, from the *Veronica parviflora*, which is largely used in New Zealand as a remedy in dysentery and diarrhœa, and some of the results exceeded my most sanguine expectations. Many who received the drug did not return to report themselves; but I have notes of three cases of chronic dysentery, varying in duration from six weeks to four years, and voiding from twenty to thirty motions containing blood and mucus daily. Fifteen doses of tincture of koroniko reduced them to one-half, other fifteen doses reduced them to three or four daily, and a third like quantity effected a complete cure. Judging from the few cases I have been able to follow, I augur a brilliant future for this remedy in the chronic forms of the disease."

Treatment of Abortion by Hot Water Injections.—Dr. Whitwell states that the advantages of injecting hot water into the uterus and vagina in the treatment of abortion are these: (1) The existing hæmorrhage is stopped almost instantly, and there is but little liability of return while the douche is continued. (2) There is seldom necessity for instrumental interference. (3) The patient, who may be in a state of partial collapse, is revived by the application of heat. (4) The keeping the vagina full of water allows the hand to operate with greater freedom. (5) There being no fear of hæmorrhage, the operator can work leisurely, and violence is unpardonable. (6) By carbolising the water, septicæmia is guarded against; and, lastly, nothing can be suggested which would be more likely to save the patient from pelvic inflammation, with its attendant evils. Dr. Whitwell's practice is as follows. Supposing the miscarriage inevitable, should the os be closed and the hæmorrhage not severe, and from the indications it appeared safe to temporise, he would tampon the vagina as thoroughly as possible with either styptic cotton or simple carbolised wads of absorbent cotton. The chances are that, when this was taken away, the os would be found to be dilated, and the ovum ready to be discharged into the vagina. If the os were closed, the membranes having ruptured, and it were necessary to take active measures at once, Dr. Whitwell would advise the use of an anæsthetic, feeling sure that dilatation would then be a matter of little difficulty. If, on the other hand, the os were open and the ovum presenting, he would inject the hot water into the vagina, and thus stimulate the contractions of the uterus. If this were not sufficient, either the nozzle of the syringe or an attached catheter could be passed within the cervix, and the hot water be slowly injected. Under this stimulus, the womb would quickly force the ovum into the vagina with but little manual assistance, and all hæmorrhage would cease. Should there, unfortunately, be any retention of a portion of the ovum or membranes, he would wait, and use the hot water again as soon as any oozing appeared. (*Western Lancet*, April, and *London Med. Rec.*, June, 1882.)

Mercuric Soap.—Dr. Schuster, of Aix-la-Chapelle, records some interesting investigations, made under his direction, upon the therapeutic value of mercuric soap, as compared with the older and less elegant forms of inunction of mercurials hitherto employed. Experiments made by Vajda and Paschkis in Vienna having tended to show that mercury could be detected in the urine (by Ludwig's method) in a large majority of cases treated by simple inunction, Dr. Schuster determined to examine the urine for mercury in cases treated, first with the soap and afterwards with the ointment, for purposes of comparison. The chemical processes were undertaken by Dr. Schridde, employing the Fürbringer-Ludwig method, with the additions described by himself in *Berlin. klin. Woch.*, No. 34, 1881. Four cases of well-marked syphilis were thus treated. In only two cases was mercury detected in the urine, as well after the use of the soap as after that of the ointment. All the cases showed improvement, but in none of them was the improvement more marked in the one case than the other. The therapeutic evidence, then, would tend to show that the preparations are of equal value, whilst the chemical evidence is negative. Further experiments, recorded elsewhere, prove that the appearance of mercury in the urine is a less common occurrence than has been supposed. The mercuric soap, which is now sold in twenty-gramme cakes, each containing four grammes of pure quicksilver, forms a good lather with ordinary water, and, being allowed to dry on the skin, leaves behind a thin grey layer of mercury, which, again, can be removed in a moment by washing, if required. It may thus be applied for longer or shorter time to various surfaces of the body; and although, like the other preparations, it is liable to produce a diffuse erythema if long continued in one spot, it will recommend itself for use in travelling, and also possibly as a means of administering mercury in cases where unreasoning prejudice forbids its use in any other way. (*London Med. Rec.* June, 1882.)

Foreign Bodies in the Air-passages.—Dr. J. R. Weist after a study of one thousand cases of this accident, sums up his conclusions in the following rules :—1. When a foreign body is lodged either in the larynx, trachea, or bronchia, the use of emetics, errhines, or similar means should not be employed, as they increase the sufferings of the patient, and do not increase his chances of recovery. 2. Inversion of the body and succussion are dangerous, and should not be practised unless the windpipe has been previously opened. 3. The presence simply of a foreign body in the larynx, trachea, or bronchia, does not make bronchotomy necessary. 4. While a foreign body causes no dangerous symptoms, bronchotomy should not be performed. 5. While a foreign body remains fixed in the trachea or bronchia, as a general rule bronchotomy should not be practised. 6. When symptoms of suffocation are present, or occur at frequent intervals, bronchotomy should be resorted to without delay. 7. When the foreign body is lodged in the larynx, there being no paroxysms of strangulation, but an increasing difficulty of respiration from œdema or inflammation, bronchotomy is demanded. 8. When the foreign body is movable in the trachea, and excites frequent attacks of strangulation, bronchotomy should be performed. [Bronchotomy is used as a general term to include laryngotomy, tracheotomy, &c.] (*American Practitioner*, Aug. 1882.)

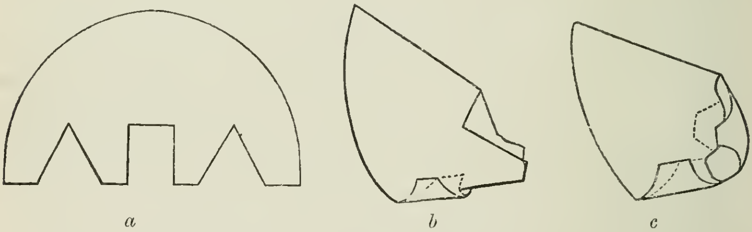
The Physiological Activity of Super-oxidised Molecules.—Dr. Charles A. Cameron, of Dublin, has come to the conclusion that the bromates and iodates are physiologically more active than the corresponding bromides and iodides. He believes that physiological activity is proportioned to high atomic and molecular weight, and to the unsaturated condition of molecules. The facts which support the theory that unsaturated molecules produce a more powerful action upon the system than saturated molecules, are more convincing than the facts upon which the other theories rest. The author considers that the term "super-oxidised," might, for want of a better one, be applied to molecules containing a larger number of oxygen atoms than are requisite to saturate the other atoms present. The iodates, periodates, bromates, and perbromates are composed of super-oxidised molecules. Super-oxidised molecules are perhaps to be properly regarded as unsaturated; their oxygen atoms are as imperfectly saturated as are the carbon atoms in carbon monoxide. In the compound KI, each of its two atoms has its unit of equivalence perfectly satisfied by combination with the other atom; the compound is therefore saturated and stable. The addition of four oxygen atoms to KI produces an unsaturated and unstable body, and therefore one likely to be physiologically more active than the stable KI, or KBr, or NaCl. In 1869 [*Pract.* i. 366], the author introduced the *ferric iodate* (Fe_2, $6IO_3$), as a substitute for the ferrous iodide, and the therapeutic value of the former seems to have been well established. More than a year ago he also suggested the employment of quinine iodate and bromate. These compounds, especially the former, have been largely prescribed in Dublin, and have been found of great value in sluggish cases of pulmonary congestion, neuralgia, severe articular pains, malarial enlargement of the spleen, and secondary syphilitic disease. The quinine iodate and bromate have been used chiefly in the form of a granulated effervescing preparation, containing two grains of the quinine salt (a dose) per drachm. Of *iodate of quinine* only very meagre accounts are to be met with in chemical books or journals. The author prepared it by neutralising freshly precipitated quinine hydrate with iodic acid dissolved in not less than eight parts of water. The iodate forms in exceedingly minute needles, of pearly lustre, which at 100° C. become yellowish. It dissolves freely in spirit of wine and hydrochloric acid, less freely in ether, and sparingly in strong alcohol and chloroform. It is more or less soluble in all the vegetable acids. One part dissolves in seven hundred parts of cold water; at 100° C. it undergoes slight decomposition. Of *quinine bromate* no mention can be found in books or journals. It may be prepared by precipitating barium bromate by quinine sulphate, or by neutralising bromic acid with quinine. It forms asbestos-like masses, which, under the microscope, are found to consist of very long needles. It is much more soluble than the iodate, namely, to the extent of one part in two hundred and fifty parts of water. Touched with strong sulphuric acid, it explodes, sends off a puff of smoke, and all but wholly disappears. It is soluble in hydrochloric, acetic, dilute sulphuric, and other acids; also in spirit of wine, and but very sparingly in ether and chloroform. Shortly after the administration of quinine iodate, both iodic and hydriodic acids are found in the urine; later on the quinine makes its appearance. The continued ebullition of quinine bromate in water causes the solution to acquire a blue colour, exactly like that of indigo. The colour is bleached by nitric acid, but is not affected by dilute sulphuric, or hydrochloric acid, or by ammonia. (*Dublin Journ. of Med. Science*, VI. 1882.)

The Action of Quinine and Salicylic Acid on the Ear.—In order to ascertain whether the noises in the ears produced by salicylic acid and by quinine are due to a congestion of the labyrinth, Dr. Kirchner has instituted some experiments in the pharmacological laboratory at Würzburg. The noise in the ears is sometimes accompanied by giddiness and deafness, which, usually ceasing when the medicine is discontinued, sometimes persists as a serious malady. Kirchner employed in his experiments rabbits, cats, dogs, and guinea-pigs. His conclusions are that both these agents cause hyperæmia of the tympanum, which may go on to hæmorrhage, and that the whole of the labyrinth participates in the congestion. It may become so intense that, if it lasts long, it will cause of necessity an alteration in the nerve filaments, and it may lead to exudation. This congestion he regards as produced by vaso-motor mechanism. In this conclusion, however, another series of observations made by Weber-Liel and Guder does not agree. They observed carefully the symptoms produced in certain healthy individuals by a moderate dose (fifteen grains) of quinine, and noted, during two hours and a half, a gradual fall in the temperature of the external auditory meatus, corresponding to the diminution in the general temperature of the body. No hyperæmia could be detected in the meatus, the membrana tympani, or the handle of the malleus, either during this period or later. On the contrary, in five cases a slight hyperæmia which existed previously was found to disappear. The subjective noises in the ears come on at the end of an hour or an hour and a half, and continue for ten or twelve hours, while the deafness comes on one or two hours later than the tinnitus, and is greatest at the time that the general temperature of the body is lowest. Similar experiments were made with salicylic acid. Four or five grammes of salicylic acid caused a diminution in the temperature of the external auditory meatus, which falls in the course of two or three hours to 95°. No indication of congestion could be discovered, and, as in the case of quinine, previous hyperæmia became lessened. Noises in the ear came on later and lasted longer than in the case of quinine. The deafness was very marked, and continued in some instances for several days, and in some cases, in which there existed previous ear disease, the loss of hearing was more prolonged, enduring in one case for nine months. In more than half the cases giddiness came on a little after the other subjective symptoms. Comparing the effects of salicylic acid and quinine, it appears that the former causes a less considerable depression of temperature and a more prolonged diminution in hearing. It is difficult, therefore, to ascribe the aural effects either to congestion or to anæmia, and if these observations are reliable, they would seem to be due to a primary nervous influence. (*Lancet,* Aug. 26, 1882.)

Notes and Queries.

Neale's Medical Digest.—In regard to the omission of P. for *Practitioner* in the list of abbreviations, Dr. Neale wishes us to state, that it was not discovered until several copies of the work were sent out, and then a card was immediately forwarded to each person who had received a copy pointing out the omission.

Dr. Burney Yeo's Inhaler.—Dr. Burney Yeo has invented a form of respirator for inhalation in cases of chest disease which is at once simple, cheap, and effective. It is composed of perforated zinc, a piece of which is cut into the shape represented in the following diagram *a*. It is then bent round so that the two ends overlap as represented in *b*, and the two central projecting pieces are next turned in as shown in *c*; between the two projections a piece of sponge is placed and upon it is dropped any liquid, the inhalation of which is desired. The apparatus is then placed over the nose and retained in its place by tapes or elastic fastened to the two sides and tied round the back of the head or over the ears. Its disadvantage is its somewhat unsightly appearance; but this is, we fear, inseparable from all inhalers of this sort. Its advantages are that it is light, convenient, and can be made in the course of a few minutes, and its cost is so exceedingly small (less than one penny) that it is within the reach of the poorest.



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⁂ Any of the foreign works may be procured on application to Messrs. DULAU, of Soho Square, W.C.; WILLIAMS and NORGATE, of Henrietta Street, Covent Garden, W.C.; or BAILLIÈRE, of King William Street, Charing Cross.

Department of Public Health.

ON PREVENTIVE MEDICINE IN ITS RELATION TO THE GENERAL PRACTITIONER.

BY J. WILKIE BURMAN, M.D. EDIN., S. SC. CERT. CAMB.

Late Medical Superintendent, Wilts County Asylum, Devizes.

(*Continued from* p. 240.)

According to Professor Frankland (p. 843 of his *Experimental Researches*, published by Van Voorst), the composition of human milk and that of the ass and cow, is, respectively, as follows :—

	Human.	Ass.	Cow.
Casein	2·7	1·7	4·2
Butter	3·5	1·3	3·8
Milk Sugar	5·	4·5	3·8
Salts	·2	·5	·7
Total Solids	11·4	8·	12·5
Water	88·6	92·	87·5
Parts	100·0	100·0	100·0

" The above percentages show that by the *removal* of one-third of the *casein* from *cow's* milk, and the *addition* of about one-third of milk-sugar, a liquid is obtained which closely approaches *human* milk in composition, the percentage amount of the four chief constituents being then—casein 2·8, butter 3·8, milk-sugar 5· and salts ·7. I was led to the preparation of this (artificial human) milk, by the serious illness of one of my children, who was fed, for the first three months of his life, upon the various popular substitutes for human milk : during the greater part of that time he suffered from diarrhœa and was at length reduced to such an extreme degree of emaciation as to leave faint hopes of his living more than a few days. He was then fed *exclusively* upon this artificial human milk (prepared as below described) until he was twelve months old. His condition began immediately to improve, and, at the end of that year, he would probably have gained a prize at a baby-show." The method of preparation of this artificial human milk as recommended and used by Professor Frankland is as follows:—Let one-third of a pint of new cow's milk stand twelve hours, then remove the *cream* and add it to two-thirds of a pint of new milk as fresh from the cow as possible. To that one-third of a pint of blue (or skim) milk left after taking away the cream, add a piece of rennet[1] (about one square inch in size) which after it has served its purpose can be taken out and used daily for a month or two, and allow the vessel holding the skim milk to be placed in warm water and there remain for from five to fifteen minutes until *curdling* is effected. Break up the curd repeatedly, and carefully separate the *whole* of the *whey*, which should then be rapidly heated to boiling in a small tin pan placed over a spirit or gas-lamp: during this heating a *further* quantity of *casein* (technically termed "fleetings") separates, and so straining (after this) through fine muslin is then required. Now dissolve 110 grains of powdered milk-sugar in the *hot whey* and mix it with the two-thirds of a pint of new milk as before prepared with extra cream. This gives us one pint of artificial human milk which should be used *within twelve hours* of its preparation—all the vessels and apparatus concerned in the manufacture being kept *scrupulously clean*.[2]

To prepare such an artificial substitute for human milk in this way is really no more complicated and difficult a process than many which cooks and others daily and regularly perform, without thinking much of the trouble; and it is certainly a more simple and cheaper expedient than resorting to the use of asses' milk which, as we know, most nearly (though not so nearly as this artificial substitute) approaches human milk in composition; and it would obviate the necessity for wet-nurses, the resort to which is not always available, though, of course, it should be the first, as it is the most natural, resort, where it can be afforded. But I am afraid that all nurses are not *cooks*, and that it would be difficult nowadays to secure the services of the latter functionaries in any capacity beyond their own special sphere, and, consequently, it is unlikely that we should be able to get the artificial substitute made at home. It is very desirable, therefore, that it should be so manufactured elsewhere (as already suggested), and, being procurable, our clients would, I think, readily avail themselves of its use, and be recouped for the extra expense by the saving of trouble at home and by the advantages that would ensue to the child. In *human* milk *alone* (or in some such artificial substitute) are we able to find an assimilable and *complete* food for sucking infants—containing as it does *all* the necessary constituents for the support of life and the promotion of growth, and these too, in exactly the *proper proportion.* There are, of course, from time to time, as we have all no doubt experienced, rare cases in which even this natural food cannot be digested and assimilated in sufficient quantity, either from idiosyncrasy or disease, and in such cases I have found the supplemental use of raw beef, stripped of fibre and fat, and well pounded up in a mortar with a little sugar of milk (which has been strongly recommended by Ringer and others) to act very well, and it certainly is a far better and more natural alternative than the resort to starchy food substances, which cannot be digested by the young infant owing both to imperfection of the salivary secretion and to its being, to a great extent, lost by dribbling from the mouth.

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[1] These are the exact instructions of Dr. Frankland; but I have myself generally used, or directed to be used, *essence* of rennet, as being more readily obtainable.

[2] Since this paper was written such an artificial human milk has been advertised by the Aylesbury Dairy Company, on the recommendation of Professor Playfair, of King's College.

Errors of dieting in children are by no means confined to those under one year of age, for we certainly often find their so-called "*milk*"-teeth made to subserve purposes which would not justify the use of that designation as applied to them. I think it is generally agreed, amongst medical men, that after the age of one year, and up to that of five years, the diet ought, in the main, to consist of cow's milk and farinaceous substances, but we are all aware that this rule is not generally attended to by our clients, and that, both at this period of life and in old age, when the diet should be of the most simple and assimilable character, much disease and trouble continue to prevail from improper and over-feeding. Our clients are too apt to consider milk as a food only fit for babes and sucklings, and we require to impress upon them the great value of such an assimilable and complete food as cow's milk, along with duly varied farinaceous substances, in the case of children even up to five years of age. Sir William Jenner tells us, in his recent lecture on the treatment of typhoid fever, and when deprecating the too free use of milk in that disease, that a distinguished chemist once remarked to him—"Do not forget that a pint of milk contains as much solid animal matter as a full-sized mutton chop," the *casein* being precipitated in the solid form in the stomach previous to digestion; and I think we might well impress this practical information on parents, in which case they would not be so likely to discard milk as a food after the suckling period is over, and they might eventually be brought to see that this is, perhaps, the cheapest way (for skim or butter-milk will answer the purpose in this respect just as well) in which we can supply the animal food necessary for nutrition, whilst at the same time it is administered in the most assimilable form ; to say nothing of the advantages to the children in thus getting a large quantity of the necessary proportion of water from such a naturally *pure* and *uncontaminated* source.

After the age of five years, and when the permanent teeth are all cut, much more latitude as to the nature of the food is of course allowable ; and indeed the principal errors we have to combat thereafter are over-feeding in proportion to work done and want of due variety in the food substances taken. Doubtless from such sources many diseases and predispositions to disease take their origin, to say nothing on the special subject of those arising from the abuse of alcoholic and other liquors and from various other causes too numerous to be referred to here.

Leaving the subject of feeding, I would next briefly refer to the different *crises* that occur during the period of life, at each of which prevenient medical attention and advice might avert and prevent many diseases peculiar to those crises. First, we have, of course, the critical period of primary dentition, which is perhaps the most important of all, and during which many deaths occur from convulsions, diarrhœa, &c. The important benefit that would accrue from our having facilities for inspection of children during this crisis is self-evident, and in many cases by timely relief of gum-tension by scarification, and the use of other precautions, we should be able to forestall much of the serious disease so frequently due to such sources of irritation. Then comes the period of the secondary dentition, a critical period, the desirableness of medical supervision during which cannot be over-estimated; for, at this time, excepting the wisdom-teeth, we have *all* the teeth in the gums *at one time*, the milk-teeth being all cut, and the permanent teeth at the same time fully developed and forcing the others out. No wonder, then, that at this age we often find children peevish and irritable and wayward, and they must be liable to certain risks from irritation at this period which should receive due consideration—all the more as we have not the local facilities for ready relief by scarification such as we have during the period of primary dentition, and other less simple measures may be requisite. The cutting of the wisdom-teeth, moreover, is not altogether devoid of risk and danger, for I have known epilepsy to take its origin from such a source of irritation. Under certain circumstances, there can be no doubt that timely removal of loose teeth, or scarification and relief of gum-tension would be quite as successful, as a preventive measure, as at the other dentitional periods. Then, on the attaining of puberty, we have another crisis before us, which is of peculiar importance as to possible preventive measures in the case of the female. Feelings of delicacy would naturally prevent over-much inquiry in this respect, but disorders with regard to the menstrual functions are often allowed to develop themselves and cause inconvenience before they come under our cognisance. We should, in the course of regular medical visitation, be able to notice and draw attention to certain external objective symptoms of such disorders, perhaps unnoticed by our clients, and thus we should most probably hear of such disorders sooner and be able to deal with and treat them more readily and successfully at the outset than we should later on. Further on I shall have some general remarks to make applicable to all the crises, and I shall not now therefore dwell on this particular crisis further than to state that it is about this time that the primary vaccination of infancy (especially when imperfectly performed at that time) would seem, according to experience, to begin to diminish in its protective effect; and we should, therefore, in all cases about the age of puberty recommend *re-vaccination*, whether there be small-pox about or not, and especially if that disease be prevalent at the time. Recent statistics with regard to the occurrence of small-pox show that that disease, formerly so peculiarly common and fatal amongst infants and young children, now very rarely affects them, owing to the protective influence of the primary vaccination; and they also show that the present susceptibility to the disease increases between the ages of ten and twenty years, and that it is proportionate to the number and quality of the primary cicatrices. Re-vaccination about this time is also of paramount importance, because, as Dr. Marson has shown, with good primary scars and after successful re-vaccination, the immunity from small-pox is thenceforth as nearly as possible perfect and permanent. This fact he demonstrates by referring to his experience at the London Small-Pox Hospital, where, during a period of no less than forty-one years, all the nurses were regularly re-vaccinated at once on their being engaged, and during the whole of that time *not a single* nurse ever contracted the disease at all in any shape or form. No doubt there are exceptional instances of individual idiosyncrasy with regard to susceptibility to this disease (as in the case of some of the other communicable diseases which generally never occur more than once in a lifetime) even after vaccination and re-vaccination; but these are very rare indeed. Professor Corfield, of University College, records the case of a medical man with whom he was acquainted, who had had small-pox *three* times, though he had been duly vaccinated and frequently re-vaccinated, and who expressed a firm belief that he would again contract the disease if he should venture to attend another case.

Finally, we have the (so-called) climacteric critical period, or, in women, the "change of life," which is popularly and very properly, in my opinion, considered as being a crisis of no small importance. With the cessation of child-bearing, and the disappearance of the menstrual flow, we have produced certain conditions predisposing to disease, which, if observed and attended to in time might probably be removed, and the diseases predisposed to thus prevented. I believe that with regular medical inspection and due precautions many of our clients might be safely carried through this crisis, who would otherwise certainly suffer more or less. We have, at this period in the female sex, to bear in mind the impairment of the constitution, commonly observed, according to Jenner, towards and at the end of a long period of child-bearing, and, by appropriate advice and attention, to prevent this temporary debility, where it may exist, from ripening into permanent constitutional defect. And we have, moreover, to consider the state of the blood that must be engendered when, after twenty-five years or so of the accustomed menstrual discharge, or in its absence of the equivalent effect on the blood that child-bearing causes, this function ceases. There must be, in these circumstances, more or less of such conditions as we have all, from time to time, no doubt observed to occur on the closing up and healing of discharging ulcers of old standing, which effects I have known patients desirous to avoid by obstinately refusing to have the ulcer completely healed, or healed up again on its breaking out afresh. No doubt there is a great power of accommodation to such altered circumstances in the human system, but this accommodation takes time to perfect itself, and it is during this time that we have most to fear and to be on the look-out against.

Having thus briefly and separately referred to these different crises occurring during the natural lifetime, there is one general consideration applicable to all of them, viz., that it is at these critical periods that hereditary tendencies to disease are very apt to produce their fell effects, and it is at these periods, consequently, that hereditary diseases most commonly make their appearance, the nature of the disease being of course more or less regulated by the particular tendencies, and by the age of the patient. Both at the crisis of primary dentition and that of the secondary dentition, and at puberty, in both sexes, epilepsy is very apt to make its appearance (and especially so where there may be hereditary tendency) either independently and spontaneously, or as the outcome and development into the more serious and permanent condition of the *ordinary convulsions* arising from peripheral irritation at the dentitional periods. This condition, if not checked at the very outset, when most amenable to treatment, ripens into a confirmed habit of body, and each succeeding fit leaving the mind weaker than it was before, we ultimately have produced the well-known epileptic dementia, which may almost be said to be incurable, and which contributes to the population of our lunatic asylums no less than 16 per cent. of the total number of inmates confined therein. Then we are all well aware of the other forms of insanity, such as hysterical mania (so called for want of a better name) which is apt to occur, more particularly in cases with hereditary tendency, at and about the age of puberty in both sexes, but more especially in the female sex, as also of the forms of insanity such as mania, melancholia, &c., so frequently observed to occur about the climacteric period in both sexes; and I hold that it is not only possible, but probable, for the development of such hereditary tendencies and the occurrence of such and other diseases at those periods to be prevented or checked, to a greater or less extent, by prevenient attention and medical supervision during the height of the crises in each case, and until, at any rate, the accommodation of the system to the altered circumstances has become established. It is, moreover, at the climacteric period, in both sexes, that the powers begin to wane, and the effects of former excesses and abuses to develop themselves, and though we cannot hope to prevent natural decadence of the powers and ordinary senile decay, it is possible, under a system of careful medical supervision and prevenient attention, at any rate to prevent the *premature* development of the ordinary effects of senility, which is by no means uncommon in this fast age.

Then apart from these critical periods, how much could be done with regard to the prevention of pulmonary consumption, by due medical advice given and acted up to, as to the nature of the occupation most suitable for those who may have a predisposition to that disease. The alarming mortality from phthisis pulmonalis between the ages of twenty and thirty-five, which constitutes just about *one-half* of the total mortality in this country, during this, the essentially working period of life, would tend to show that the *nature* of the *occupation* has *much* to do with the production of that disease. And, indeed, it is a question whether medical advice should not, in all cases, be sought and obtained before embarking on an occupation which will probably be engaged in during the whole of that period, or longer, as the case may be. That is to say, the nature of the occupation of any particular person should, as far as possible, be suitable to his constitution, state of health, and general tendency ; and as to this, of course our clients are scarcely of themselves qualified to form a proper judgment. Then the danger of over-working either brain or body during the period of active growth is self-evident, and due warning in time should be afforded against this not uncommon source of disease or defect. Lastly, we have to consider the great necessity there is for medical supervision during old age, when, at this extreme of life, the more the diet and general arrangements approximate to those indicated at the other extreme, the better. The greatest danger of all at this extreme, as in the other, is that from exposure to cold, which arises, in this instance, not from comparatively greater extent of cooling surface, as in childhood, but from deficient heat production and general failure of the powers. Fortunately, however, this is generally sufficiently well guarded against by our clients, in the case of old people, and the errors committed are rather in the way of too much coddling, which increases the risks run on a sudden exposure to cold. With regard to the *toothless* condition in the later periods of life, I feel strongly convinced that the greater and more extensive use of artificial teeth should be strongly urged, especially where teeth decay prematurely. We well know that in default of the natural teeth, or the artificial substitutes, much disease of different kinds, and of a more or less serious nature, is apt to arise from the use of solid food that cannot be properly masticated and digested. I have a patient who has regular attacks of diarrhœa when she takes meat, as she often does, in the ordinary form ; but these soon disappear under the use of mince-meat, and probably would not recur if this was always taken.

Much has been done, of late years, by careful preparation or "making up" of patients previous to surgical operations, and the use of external antiseptic precautions, to promote greater success as to the results of the operations, and to diminish the mortality arising therefrom; but it is questionable whether similar prevenient attention has been sufficiently paid to the pregnant female previous to the natural operation of labour which has its own peculiar surgical and other risks. It is evident that, where a patient is known to be liable to floodings after labour, by due medical attention during the period of pregnancy, we might either avert this risk altogether, or at any rate, by getting the patient's blood into good condition, and bringing up her bodily health to as high a standard as possible, we should enable her better to bear loss of blood and render her more likely to rally from flooding.[1] I observe, in a recent discussion at the Obstetrical Society, that Dr. Edis laid great stress on this careful attention to the pregnant female, with a view to the prevention of *post-partum* hæmorrhage, or at any rate to diminish its risks; and I think it is a subject deserving of more consideration than it has yet received; but it is evident that without regular medical visitation and supervision such precautionary measures, where indicated, could not be seen to and properly carried out. There is a further development of the antiseptic system, which it seems to me is possible and feasible, and which I have already advocated in a paper in the *Lancet* for Nov. 22, 1879. It would consist, as I have suggested, in a more intimate application of that system, as a preventive measure, than at present obtains, by the use of *internal antiseptics*, such as the sulphite of soda, and other sulphites as recommended by Prof. Polli of Milan, so as to bring the blood into a repelling and neutralising condition, with regard to the possible introduction of septic matter from without, and fortify it against the inroads of such, should it unfortunately gain access to the blood in spite of external antiseptic precautions. It appears to me that such further precautions, whilst being useful as an adjuvant and additional safeguard in cases where the plan of Lister can be adopted, would also be of special service where that plan could not be adopted, as in the case of the open wound, or absorbing surface left after delivery, and in lithotomy, &c., where septic matters must necessarily form and have to be provided against in some way or another to prevent risk from their absorption. I need not here dwell upon the subject, but would refer those who may be specially interested in the matter to my paper.

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[1] Dr. Playfair, in his *Science and Practice of Midwifery*, vol. ii. p. 102 *et seq.*, refers to *post-partum* hæmorrhage as "one of the most frequent complications of delivery," though, at the same time, he considers it as being, "to a great extent, a preventable accident." And there can be no doubt but that, with due preparation of the patient, as above described, during pregnancy, and with *proper* management of the third stage of labour, as described by Dr. Playfair in vol. i. of his work (p. 336 *et seq.*), such *post-partum* hæmorrhage can be reduced to a *minimum* —the placenta being always *expressed* and caused to be expelled from the uterus by a *vis a tergo*, not drawn out by a *vis a fronte*, according to the plan recommended to be adopted by that eminent authority.

Then with regard to another preventive measure : we are all well aware how many lives, both of mothers and children, are annually saved by the induction of premature labour—where this non-natural operation is unfortunately rendered necessary by neglect of the medical rules that ought to regulate marriage, or by other circumstances. But this is a special department of practice and a very limited field to which I need not further now refer.

In conclusion, and in further support of my advocacy of regular medical supervision, with a view to the prevention and more successful treatment of disease, I would draw attention to the oftentimes *insidious* nature of the onset of disease—the advent of which is so frequently heralded by well known indications and signs, recognisable by the medical practitioner, but considered by the patient as trifling and ordinary ailments, if noticed at all. Oftentimes, by means of physiognomical diagnosis, and by attention to objective symptoms, we could, if we had the opportunity, observe and attack a disease long before the patient had any subjective symptoms of its existence; and such being the case we might happily be enabled to prevent its further development, or at any rate to deal with it more successfully at its outset than we should later on. These remarks especially apply to the occurrence of mental insanity—in which the *prodromata* are usually well marked and of considerable duration, and easily recognisable to those having experience in such diseases, but at the same time frequently neglected, as of no importance, and allowed to run on by our patients, who are especially loath, with respect to this particular form of disease, to admit the possibility of its occurrence. Neglect of these *prodromata* and want of early medical attention and advice, lead annually to a large number of preventable deaths from suicide, which are so constantly occurring *out* of asylums and so rarely *in* them. And at any rate such neglect of the *prodromata*, and want of sufficiently early recognition and treatment of the disease, always tend to render the prognosis more gloomy; for, if anything is certain with regard to mental insanity, it is that the prospect of recovery, in curable cases, is directly in proportion to the earliness of the date at which patients suffering from it are brought under experienced medical attention and care—which need not necessarily mean confinement in an asylum. Medical superintendents of asylums are constantly lamenting, in their annual reports, the long period that is often allowed to elapse before such cases are placed under medical supervision and treatment, and are constantly illustrating by statistics what an adverse influence such delay has upon the recovery rate. After the admission of patients into asylums it is everywhere found that the great majority of recoveries take place within the first year after their reception; after this recovery is of very rare occurrence, and gets rarer and rarer still in proportion to the duration of the disease. I would therefore draw particular attention to the advisableness of our being in a position to recognise in time the *prodromata* and earlier symptoms of this disease in its various forms—because its curable stage is so essentially limited; because if allowed to pass into the incurable stage the result is a life-long trouble and burden to the friends and the ratepayers (to say nothing of the patients themselves); and because it is a subject, the great importance of which has been strongly impressed upon me by considerable practical experience. In reference to this dire disease, it is quite certain that no great strides can be made with regard to its prevention and more successful treatment, without the active co-operation of the general medical practitioner, under whose notice, in all cases, the disease is in the first instance brought.

Space will not allow of my referring to the all-important subject of hygienic arrangements and surroundings, with regard to which regular medical inspection and attention would undoubtedly lead to the prevention of much disease that now exists. We are all sufficiently aware how frequently disease arises, and how, where it already exists, its intensity is often increased or its nature and course unfavourably modified by defective sanitary apparatus and insanitary arrangements; and we also know the alarming effect on the rate of infantile mortality that general insanitary conditions give rise to. But whilst all this is well known to us, there nevertheless prevails much ignorance and neglect of these matters amongst our patients and clients, which might be remedied by regular medical visitation and inspection.[1] There can be no doubt that, in this way, we should be able to stamp out and avert much preventable disease arising from such neglected sources, and favourably to modify the nature and course of certain non-preventable and other diseases that are influenced for the worse by defective sanitary arrangements.

Any one paying attention to the indications of recent times in such matters cannot fail to observe that a decided war is being declared against the causes of preventable disease; and that the tendency now appears to be towards getting on the scent of these, hunting them down and killing, or at any rate running them to earth (so to speak) before they do any damage, and this, it must be admitted, is a wise and far-seeing (and on the part of medical men a very unselfish) policy. When universally adopted and put into practice, it will doubtless be productive of happy results, and constitute by far the most noble and worthy part of our functions as general medical practitioners. And I would repeat that we can never be successful in our mission in these respects, until, in some way or another, we secure and maintain the intelligent co-operation of our patients and clients, which, therefore, we should use our most strenuous efforts to obtain. As Canon Kingsley has eloquently remarked, "Let our hearts be bowed as the heart of one man, to say—that, so far as we have the power, so help us God, no man, woman, or child in Britain, be he prince or be he beggar, shall die henceforth of preventable disease."

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[1] Or by subscribing to the Sanitary Assurance Association, which, for a moderate fee (of 1*l.* 1*s.* per annum), secures an annual examination of the sanitary arrangements of a house with report thereon and recommendations by skilled and experienced officers.

THE PRACTITIONER.

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Original Communications.

ON THE TREATMENT OF THE NIGHT-SWEATING OF PHTHISIS.

BY WILLIAM MURRELL, M.D., M.R.C.P.,

Lecturer on Materia Medica and Therapeutics at the Westminster Hospital; Assistant-Physician to the Royal Hospital for Diseases of the Chest.

(*Continued from* vol. xxv. *p.* 257.)

XIII. AGARIC.

BY Agaric is meant the Agaric of the larch or white agaric, sometimes called the purging agaric. It is a fungus, and is known botanically as *Agaricus laricis, Boletus laricis* and *Polyporus officinalis.* It is the *Agaric blanc* or *Agaric purgatif* of French writers, and the *Lärchenschwann* of the Germans.

Agaric has been in use in the treatment of the night-sweating of phthisis for over a century. Dahen was probably its introducer. "I was consulted," he says,[1] "in the month of August 1767 by a monk who as the result of a neglected pleuro-pneumonia suffered from a severe cough which was frequently accompanied by profuse hæmoptysis. In spite of much treatment he became very weak, and this added to the sweating reduced him to a very critical condition. The administration of bark lowered the fever, but had no effect on the sweating. One of his friends finding him in this sad state told him of a poor woman who had cured several people by giving them a little piece of agaric. He adopted the treatment and the sweating soon ceased, although the remedy gave rise to obstinate diarrhœa, which was arrested with difficulty. The patient then began expectorating purulent matter profusely and the sweating seemed inclined to return, but once more the agaric triumphed. On a diet of goat's milk and other strengthening remedies the patient soon recovered, but he had always to use the agaric to check the sweating which frequently commenced troubling him again."

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[1] Dahen, *Ratio Medendi.*

Barbut[1] reports three somewhat similar cases. The first is that of a man who suffered from tertian fever, which as the result of inappropriate treatment became continuous. After two months it was followed by profuse perspirations which weakened him very much. After waiting some days to see if the sweating would continue and what would be the end of it, Barbut, finding that the patient was getting much worse, determined to try Dahen's remedy. He ordered him two grains of powdered agaric which he made him take about eight o'clock in the evening, telling him to drink after it half a glassful of water. That night the patient thought he sweated less; the next night the dose was repeated at the same hour and in the same way and the patient sweated still less; he took the agaric a third time, the sweating ceased entirely and did not return, the cure being complete. The second observation was made in the month of October 1776 in the case of a dyer who was in the first stage of pulmonary consumption, After having tried several remedies without checking the symptoms he became greatly alarmed, not so much because he got no better as because he sweated so profusely at night that he was unable to sleep. The agaric was prescribed for him in the same way and in the same dose as in the preceding case. At the expiration of five days the sweating ceased, but the chest mischief continued to progress and he died at the end of three months. The third case was a woman aged 38, who had long suffered from a severe cough with frequent hæmoptysis. She sweated most profusely especially about the body. She was ordered appropriate treatment—stewed snails and cough tisans for example—but the sweating persisted and recourse was had to agaric. The first dose stopped the sweating and the catamenia which for three months had been absent suddenly appeared. The agaric was stopped until the period was over. It was then again given and the sweating was again checked—it was very slight on the night following the third dose but it was not till the sixth night that it entirely ceased. A few days later it returned once more but as it gave rise to no inconvenience it was not necessary to resort to further treatment.

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[1] *Journal de Médicine de Roux,* t. xlvii. p. 512.

Murray[1] speaks of the use of agaric in the treatment of night-sweating but without giving any observations of his own.

Quarin,[2] so far from having found it useful, considered that it did much harm aggravating all the symptoms and accelerating the progress of the disease.

Burdach,[3] used it with much success in treatment of the sweating of phthisis giving it at bedtime in four-grain doses either in pill or suspended in mucilage.

About this time Rayer of Paris being dissatisfied with the remedies in ordinary use for arresting the night-sweating of phthisis employed agaric in a large number of cases at the Hôpital de la Charité. He appears not to have published anything on the subject himself but his cases were collected by E. Bisson and published in the form of a pamphlet[4] which contains much useful information. Bisson's cases are fourteen in number, they are most carefully recorded and as a result of his experience he arrives at the following conclusions:— 1. White agaric may be employed with advantage in the treatment of the night-sweating of phthisis. 2. In doses of four, six, eight or ten grains given at bedtime for some days it usually checks sweating when the patient is not at the same time suffering from diarrhœa. 3. When diarrhœa is also a prominent symptom the agaric should be given in combination with opium. 4. When the diarrhœa is persistent and is not checked by opium agaric is contraindicated. 5. Agaric not only checks sweating but induces sleep and prevents exhaustion. 6. Even if powerless to cure phthisis it retards the progress of the case and relieves the patient of one of the most dangerous and distressing symptoms.

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[1] *Apparatus Medicaminum*, 1790, t. v. p. 573.

[2] *Anamadversiones practicæ*, 1787, p. 56.

[3] *Journal de Chimie Médicale*, t. vii. p. 185, 1830.

[4] *De l'Emploi de l'Agaric Blanc* (*Boletus laricis*) *contre les sueurs dans la phthisie pulmonaire.* By E. Bisson, M.D. Paris, 1832.

Agaric now engaged the attention of several distinguished observers, and many papers and pamphlets were published descriptive of its virtues. One of the most frequently quoted is a work by Toël, (1831), but I have been unable to meet with a copy.[1] Andral employed it extensively in the Hôpital de la Pitié, and his cases were recorded by Max Simon.[2] The dose employed was usually from six to eight grains in two pills, gradually increased to thirty-six grains divided into six pills. On one occasion Andral gave a patient first thirty, then forty-eight, and finally sixty grains. It checked the sweating, but, as may be supposed, induced violent purging. Trousseau employed agaric extensively, and a good account of its therapeutic action will be found in the various editions of his well-known work on materia medica.[3] He usually gave about nine grains at bedtime, increasing the dose if necessary to fifteen grains. The effect was so decided that it might, he thought, be indicated by the axiom: *Cutis laxa alvus sicca, cutis sicca alvus laxa.* At the same time he remarks that this is not absolutely true, as it is not difficult to give a dose that will check the sweating without purging. In the French Pharmacopœia[4] it has long been recognised under the name of Agaric blanc officinalis, or Polypore de Mélèze, and there are two officinal preparations, the powder and liquid extract.

A good general account of the use of agaric in the night-sweating of phthisis will be found in the National Dispensatory of Stillé and Maisch, published in 1879.

Among the more recent papers on the subject may be mentioned those of Peter[1] of Paris, Wolfenden[2] of the Charing Cross Hospital, London, and Young[3] of Glasgow. Professor Peter gives the agaric in doses of three grains, or four and a half at the most, and has never found it necessary to give more. He gives details of three cases which have been under his care at La Pitié, and refers to many others. He thinks very highly of agaric in the treatment of the sweating of phthisis, but considers that after a time a kind of tolerance is established when it ceases to do good. Bouveret commenting on these observations says that agaric does not deserve the discredit into which it has fallen. Dr. Wolfenden employed agaric in the treatment of nearly forty cases, with almost complete success. He considers that it is "of such equal efficacy with atropia, that it may supplant it." He finds twenty grains at bedtime usually sufficient, though thirty grains may be necessary to quite check the sweating. Dr. Young's cases were under the care of Dr. Gairdner of the Western Infirmary at Glasgow. The drug was usually given in the form of a tincture containing ten grains to the drachm. An active principle, *agaricine*, was also extracted, which was found to represent the properties of the drug. In addition to checking sweating, the agaric was found to check cough and promote sleep. It exerted considerable influence in reducing temperature, a fall of two degrees having been noticed in a case of phthisis after the administration of gr. $\frac{1}{12}$th of agaricine.

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[1] Another work to which I have been unable to obtain access is *Notice sur le genr. Agaric considéré sous les rapports botanique, economique medical et toxicologique.* By J. H. Leveillé. Paris, 8vo, 1840.

[2] "De l'Agaric blanc pour combattre les sueurs chez les Phthisiques," Max Simon, *Bulletin Général de Thérapeutique*, 1834, t. vi. p. 334; also same journal, same volume, p. 381.

[3] Trousseau et Pidoux, *Traité de Therapeutique et de Matière Medicale.*

[4] Codex Medicamentarius, Pharmacopée Francais, 1866.

During the last three years I have treated sixty-four cases of night-sweating with agaric. They were nearly all out-patients at the Royal Hospital for Diseases of the Chest. There were 39 men, 17 women, and 8 children under the age of ten. The ages of the adults ranged from 19 to 63. The majority of cases were bad cases of phthisis, and in fifteen the physical signs indicated the presence of cavity on one or both sides.

My first observations were made with the agaric given in the form of three-grain pills. Ten patients are included in this series and the results are given in Table I. The pills caused no inconvenience, and undoubtedly had the power of checking the sweating to some extent, but their action was slow and not very certain. Being dissatisfied with the result I determined to increase the dose, but was here met with the difficulty of administration. Patients do not like bulky powders, and decidedly object to taking more than two large pills at bedtime. I appealed to Mr. Martindale, who with characteristic promptness and skill made me some pills of extract of agaric, each of which weighed three grains, and was equivalent to nine grains of the agaric powder. With these pills I made a second series of observations on eight patients (see Table II.), and the results were better in every way. The extract of agaric was decidedly active, and was a great improvement on the crude drug. Hoping to get still better results I increased my dose to half a drachm, this time giving the powder itself. The cases in this series are thirteen in number (see Table III.). The patients took the powder, but under protest. It was not a popular medicine with them. The taste is disagreeable—intensely bitter—and it is difficult, they say, to "get it down." It may be mixed with jam, but it is so light that it blows about, and half of it is lost. It will not mix well with cold water, but comes up to the top and floats about in the most persistent manner. It mixes fairly with hot water or hot milk, and most patients take it this way. The effects of a half-drachm dose are, on the whole, not pleasant; it purges violently, and the patient is much disturbed at night. It certainly checks the sweating admirably, but it is a choice of evils. Being deterred by the activity of the drug from continuing the experiments, I reduced the dose to twenty grains, making observations on fourteen patients (Table IV.). The results, as regards the sweating, were less satisfactory than with the larger dose, but there was no purging.

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[1] *Bulletin Général de Therapeutique*, 1879, t. xcvi.

[2] *Medical Times and Gazette*, October 8, 1881.

[3] *Glasgow Medical Journal*, March, 1882, vol. xvii. No. 3, p. 176.

Mr. Hampson, of St. John Street Road, has recently made for the Royal Hospital for Diseases of the Chest, a number of preparations which afford a fairly convenient mode of administering the drug. There is a tincture—1 in 6—the taste of which may be covered by the addition of a little extract of liquorice or spirits of chloroform; and there is a very useful liquid extract of agaric, twice the strength of the tincture.

How agaric acts in checking sweating is not very clear. Very little is known of its physiological action, but from some observations made on the frog's heart, I am inclined to think that it is antagonistic to muscarine. Agaric has of late been described in glowing terms as being superior to other remedies in the treatment of the sweating of phthisis. It is undoubtedly a good remedy, and there are times when it may be used with advantage, but I much doubt if it is equal to atropia, picrotoxine, pilocarpine, or Dover's powder. In small doses it is slow and uncertain in its action, whilst in large doses it is apt to purge violently. It has been suggested that the purgative action should be obviated by the addition of Dover's powder, but if we give Dover's powder we do not want the agaric, Dover's powder itself being one of our best remedies for the night-sweating of phthisis. Another difficulty is the mode of administration; patients do not like powders, and will not take large agaric pills when they can obtain prompt relief from one or two pilules of picrotoxine. Agaricine may prove a more valuable addition to our list of remedies, but that remains to be seen. Agaric has certainly not sprung very rapidly into favour, for it has taken over a hundred years to attain its present position.

Agaric has at various times been employed in the treatment of a great number of very different diseases. By Stillé and Maisch it is said to have been used by the ancients in large doses as a purgative, producing watery stools, with sometimes nausea and colic; and in small doses as an astringent to stop diarrhœa and dysentery, or to check sweating. It had also a reputation for drying up the milk in weaning. It was used as a remedy for ague, and it was at one time hoped that it might supersede bark. Parkinson (1640) recommends it in "Gout, dropsie, and falling sickness, jaundice, the collicke and hardness to make water, the sciatica or pains of the hips, the pale colour in women caused by the staying of their courses, the shortness of breath, the cough and consumption of the lungs, the spitting of blood, the paines of the mother, the sharpness of urine and the wormes: it is helpful also to cure all sorts of agues either tertians or quotidians, to ease the griping paines of the stomacke and belly, or such as have had falles or bruises, or are burster bellied."

I have given agaric with success in a few cases of hæmoptysis. Here, for example, is one :—W. B., aged 29, had suffered from a severe cough for four months, the expectoration during the whole of the time being mixed with blood; sometimes only a small quantity, but at others as much as a tablespoonful or more. He had lost flesh considerably, and for a fortnight had suffered severely from night-sweating, his clothes being wringing wet every night. There was deficient movement of the chest on the right side, and at the left apex well-marked crepitation. He was ordered half-drachm powders of agaric, one to be taken three times a-day, the last at bedtime. About two hours after each dose he was griped and strongly purged. He took only three powders and then reduced the dose to a half, but the purging continued. It did him good, however, for it stopped both the sweating and bleeding, and there was no return of either during the ensuing five weeks. In another somewhat similar case fifteen grains of powdered agaric at bedtime on three successive nights arrested a hæmoptysis of six weeks' duration. In several cases the patients stated that the agaric eased the cough and that they slept better.

TABLE I.—*Cases of Sweating treated with three-grain doses of the Agaric.*

No.	NAME.	SEX	AGE	SYMPTOMS.	PHYSICAL SIGNS.	SWEATING—DURATION AND SEVERITY OF.	TREATMENT.	RESULT.	REMARKS.
I.	J. P.	M.	50	Cough many years off and on; but, on whole, enjoys fairly good health. Of late, much expectoration with loss of flesh.	Left — little crepitation with rhonchus all over.	Every night for the last fortnight. Very profuse, enough to wet things through, pillow even quite wet.	Pil. Agar. lar. gr. iii. i. o. n. 7 days.	Thought there was a little improvement at first, but now no better; did not do much good to the night sweating.	
	,,	,,	,,	,, ,,	,, ,,	,, ,,	Rep. pil. t. d. s., last at bedtime, 7 days.	Night sweating a little better, but not much. Last night very bad.	
	,,	,,	,,	,, ,,	,, ,,	,, ,,	Rep. pil. t. d. s., with ij. at bedtime, 7 days.	Prevented sweating a great deal, but not entirely; always a little every night; not a single night free from it. Took three pills one night and purged him very much.	No improvement in general symptoms. Agaric did some good, but not a very striking success. Small dose of atropia hypodermically subsequently entirely stopped sweating.
II.	R. E.	M.	51	Cough very severe, almost constant 3 years; expectorates very much; hæmorrhage none, loss of flesh very great, nearly 3 stone.	Coarse crepitation all over both sides.	For three months nearly every night, when he awakes he begins to cough and then sweats till things are wet through. Does not sweat when asleep, and in daytime only if breath very short or on exertion.	Pil. Agar. lar. gr. iii. i. o- n. 7 days.	Night sweating better; decidedly better after second night. Cough easier, phlegm comes up more readily, breath better, sleeps better.	
	,,	,,	,,	,, ,,	,, ,,	,, ,,	Rep. pil. i. bis die, 7 days.	Night sweating not nearly so much but not quite gone, Good deal less; sleeps better at night; cough easier.	Agaric discontinued and no return of night sweating during six weeks. Did well in this case.
	,,	,,	,,	,, ,,	,, ,,	,, ,,	Rep. pil. i. t. d. s., 7 days.	Very nearly gone now.	

TABLE I. (*continued*).—*Cases of Sweating treated with three-grain doses of the Agaric.*

No.	Name.	Sex	Age	Symptoms.	Physical Signs.	Sweating—Duration and Severity of.	Treatment.	Result.	Remarks.
III.	S. J.	F.	46	Cough very severe, with much expectoration; loss of flesh very marked.	Crepitation all over both sides.	For six months almost every night. Very severe.	Pil. Agar. lar. gr. iii. i. o. n., 7 days.	Has not sweated nearly so much, last three nights especially; and great deal of improvement. Now nearly gone; first night better, and better ever since. Sleeps better too.	
	,,	,,	,,	,, ,,	,, ,,	,, ,,	Rep. pil. i. t. d. s., 4 days.	Still improving; sleeps much better at night: and very little sweating.	Agaric did well here.
IV.	J. H.	M.	33	An advanced case. Patient suffering much from cough, expectoration, dyspnœa, and all symptoms of $\phi\theta$; loss of flesh very marked.	Right—crepitation. Left—crepitation.	Almost every night for two months; finds his things wet through in morning.	Pil. Agar. lar. gr. iii. i. o. n., 7 days.	Night sweating still continues but there is a decided improvement in it.	Patient too ill to attend any longer.
V.	L. B.	F.	8	Cough, expectoration, and loss of flesh very marked last 3 months. Family history, $\phi\theta$.	Left—little crepitation near apex.	Every night, one month; directly she gets to sleep. Wets things very much—pours off her.	Pil. Agar. lar. gr. iii. i. o. n., 7 days.	Very much better. Improved every night; till fourth night, when had almost ceased. No action on bowels.	Pills were continued for a week longer and there was then no return of the night sweating for 5 weeks that she remained under observation.
VI.	J. R. L.	M.	25	A well-marked case of $\phi\theta$. Has been under treatment for the last 6 months and has improved much. Expectorates very much.	Still crepitation at both apices.	Last fortnight for the first time, very marked day and night too; might wring things they are so wet."	Pil. Agar. lar. gr. iii. i. t. d. s., last at bedtime, 7 days.	Ceased entirely on second night and none since. Did him much good in everyway—eased cough, and breathing, as well as sweating.	Was taking cod-liver oil as well, but had taken it continuously for nearly six months.
	,,	,,	,,	,, ,,	,, ,,	,, ,,	Rep. i. quater die, 7 days.	No return of sweating.	No return for a fortnight.

TABLE I. (*continued*).—*Cases of Sweating treated with three-grain doses of the Agaric.*

NO.	NAME.	SEX	AGE	SYMPTOMS.	PHYSICAL SIGNS.	SWEATING—DURATION AND SEVERITY OF	TREATMENT.	RESULT.	REMARKS.
VII.	W. B.	M.	41	Cough 12 months; expectorates great deal, thick; hæmoptysis, little at times; aphonia; lost flesh very much.	Crepitation marked both sides.	Comes on about 4 o'clock every morning, great trouble to him; has had it five months.	Pil. Agar. lar. gr. iii. i. t. d. s., 7 days.	Much better, but not gone.	Plays violin at parties and at races. Much exposed. Badly fed; drinks when he can get it.
	,,	,,	,,	,, ,,	,, ,,	,, ,,	Rep. pil. t. d. s., ii. at bedtime if necessary, 7 days.	Quite gone now—the two pills soon stopped it.	
VIII.	E. B.	F.	23	Very bad case of $\phi\theta$; patient so weak that she can hardly get to hospital.	Signs of cavity both right and left; extensive lung mischief.	Most profuse every night last four nights. Things always wet through; no rest; no ease.	Pil. Agar. lar. gr. iii. t. d. s., 7 days.	Little improvement, not much.	Taking cod liver oil at same time—pregnant three months. An almost hopeless case,
	,,	,,	,,	,, ,,	,, ,,	,, ,,	Rep. ii. o. n., 7 days.	No better. Wet through every night.	Subsequently gave (1) Muscarine, (2) Oxide of Zinc, (3) Atropia, with much benefit, soon too ill to attend longer. Evidently dying.
IX.	A. D.	F.	46	Cough 2 years; expectorates very much; lost flesh; very weak, can hardly walk.	Right—crepitation. Left—crepitation	Both night and day will run down legs and stockings as "if she had wetted them."	Pil. Agar. lar. gr. iii. ii. t. d. s., 7 days.	Did good to the sweating but had great difficulty in taking them as they made her so sick.	Muscarine subsequently checked the sweating.
X.	C. H.	F.	38	Cough very severe 2 years; worse in winter, not much in summer.	Emphysema, rhonchus both sides.	More in day than at night, chiefly when at work. Works at loom and hands and feet always wet; chiefly on exertion.	Pil. Agar. lar. gr. iii. ii. t. d. s.	Took twelve pills and then relaxed bowels very much—did little good to the sweating.	
	,,	,,	,,	,, ,,	,, ,,	Sweating worse even than last week.	Rep. pil. i. quater die, 7 days.	No improvement.	Atropia checked it at once.

TABLE II.—*Cases of Sweating treated with Extract of Agaric.*

No.	Name.	Sex	Age	Symptoms.	Physical Signs.	Sweating—Duration and Severity of	Treatment.	Result.	Remarks.
I.	H. M.	F.	20	Cough not much; expectoration little; hæmoptysis none. M. S. Br. d. φθ.	?	Night sweats one week, every night; comes on about 2 o'clock, a.m., lasts till she gets up; flannels quite wet. Sweats on hands and under arms in daytime.	Pil. Ext. Agar. gr. iii. i. o. n. 7 days.	Perspirations at night quite gone, none at all now, none last four nights.	No return for a fortnight.
	,,	,,	,,	,, ,,	,, ,,	Slight return of sweating at night.	Took one pill for three nights.	Sweating ceased.	No return of sweating.
II.	A. B.	F.	25	Cough 2 years, with much expectoration; hæmoptysis little at times; dyspnœa on exertion; loss of flesh very marked—3 stone in two years.	Left—cavity.	Three months, almost every night; all over body; comes on from 2 to 3 a.m. Wets all things through; can see mark on bed where she lies.	Pil. Ext. Agar. gr. iii. i. o. n., 6 nights.	Quite stopped the sweating.	No return for a fortnight.
III.	S. D.	F.	31	Cough 12 months; expectorates great deal; losing flesh very much; slight aphonia.	Right—cavity. Left—cavity.	A fortnight, every night. After she has been in bed for about an hour, everything wet through, so that she is quite cold.	Pil. Ext. Agar. gr. iii. i. o. n., 7 days.	Night sweats much better, not much improvement till fifth night; only slight now.	On another occasion sweating returned, and then three 3-grain agaric pills at bedtime stopped it in a week.
	,,	,,	,,	,, ,,	,, ,,		Rep. pil. ii. o. n., 14 days.	None at all now; the two pills did much better than one.	
IV.	J. D.	M.	22	Cough six weeks only, with much purulent expectoration; hæmorrhage, none; lost flesh—1 stone in 6 weeks. Quite well till then. M. d. in 2 months, probably from φθ.	Right—cavity. Left—cavity. Both well marked.	Night sweats three weeks, not every night; sometimes misses, but most night sweats. Comes on when asleep, gets soaking wet, sweats all over—makes him very weak.	Pil. Ext. Agar. gr. iii. i. t. d. s.	Sweating very much less, not half it was.	Patient unable to come, and sweating returned in a week.
	,,	,,	,,	,, ,,	,, ,,	Has had no medicine for nearly a month. Night sweats now very severe.	Rep. pil. t. d. s., last at bedtime, 7 days.	Very great deal better, now nearly all gone; better after fourth night.	On another occasion he had an agaric pill three times a day for a week; but without stopping the sweating.

TABLE II. (*continued*).—*Cases of Sweating treated with Extract of Agaric.*

No.	NAME.	SEX	AGE	SYMPTOMS.	PHYSICAL SIGNS.	SWEATING—DURATION AND SEVERITY OF.	TREATMENT.	RESULT.	REMARKS.
V.	J. H A.	M.	31	Cough 2 years with much expectoration; lost flesh. 18 months very marked.	Right—crepitation at apex. Left—crepitation all over.	Off and on for a month. Very severe; wet through.	Pil. Ext. Agar. gr. iii. ii. o. n., 7 days.	Night sweat worse if anything; every night wet through.	Purged him very much.
	”	”	”	” ”	” ”	” ”	Rep. pil. iii. o. n., 7 days.	A little better, but sweated five nights out of the seven, even one night when he took four pills. Did some good.	
	”	”	”	” ”	” ”	” ”	Rep. 14 days.	Slight improvement only. If takes four pills is better.	Very little benefit in this case.
VI.	G. D.	M.	19	Cough; expectoration; hæmoptysis; loss of flesh.	Left—crepitation under clavicle.	One week, every night; very severe.	Pil. Ext. Agar. gr. iii. ii. o. n. 7 days.	No improvement.	
	”	”	”	” ”	” ”	” ”	Rep. pil. iii. o. n. 7 days.	Very decided improvement. Better after third night.	
VII.	C. S.	M.	19	Cough; expectoration; lost flesh very much.	Right.—Br. br. under clavicle. Left—crepitation.	Four months, almost every night; and almost all night. Comes on about midnight all over the body.	Pil. Ext. Agar. gr. iii. iii. o. n., 7 days.	Quite gone, none after second night.	No return in three weeks.
VIII.	S. C.	M.	28	Cough, with expectoration, 3 months; lost flesh.	Crepitation at left base post.	Third month, almost every night, but not always; comes on between 2 and 3 a.m., wets everything.	Pil. Ext. Agar. gr. iii. ii. o. n., 7 days.	Quite gone now; none after third night.	No return a fortnight later.

TABLE III.—*Cases of Sweating treated with half-drachm doses of the Agaric.*

No.	Name.	Sex	Age	Symptoms.	Physical Signs.	Sweating—Duration and Severity of.	Treatment.	Result.	Remarks.
I.	R. M. G.	M.	35	Cough 2 years all the year round, hacking, worse last 6 months; expectorated many months, but less now, though still yellow and thick; hæmorrhage 2 years ago half a cupful, and as much five or six times since; breath very short on exertion. Has been under treatment for a year, and has improved much by inhaling "pure terebene" on a respiration for 8 or 10 hours a day.	Right—Well marked bronchial breathing in infra clavicle, but no crepitation now. Left—Friction at base in front. Six months ago crepitation all over both sides in front; great improvement on the "pure terebene."	Suffers from it frequently and severely; has had it now for about a week; is very severe—awakes about daybreak and finds himself wet all over the body, even to legs and feet.	Pulv. Agar. lar. ʒss. vj. i. o. n.	Entirely ceased on third night, but better on second night.	Acted slightly on bowels. Sweating returned in a fortnight.
						Has had it this time 3 days.	Rep. pulv.	Quite gone by third night; not much after first night.	Purged him very much. A little return of sweating a week later, but very slight. This patient had frequently taken granules of picrotoxine, each containing ½ milligramme, for the sweating, with much benefit.
II.	J. A.	M.	22	Cough; expectoration; hæmorrhage at times; losing flesh very much.	Right—crepitation. Left—crepitation.	Every night for last fortnight; comes on in middle of night, not very severe, but enough to make things damp.	Pulv. Agar. lar. ʒss. xii. i. o. n.	Night sweating very much better—better after 2 doses.	Cough better; expectoration easier; bowels open 2 or 3 times a day since he has taken the powders. No return of sweating in 3 weeks.
III.	W. C. H.	M.	27	Cough 6 months; expectoration very much; hæmorrhage none; loss of flesh very great.	Right—vomiting. Left—vomiting.	Very much last 5 weeks; every night as soon as he gets to bed. Wets everything.	Pulv. Agar. lar. ʒss. vj i. o. n.	Night sweating quite gone.	Cough better, especially at night; expectoration easier.
	,,	,,	,,	,, ,,	,, ,,	,, ,,	Rep. 14 days.	No sweating.	"Better in every way."

TABLE III. (*continued*)—*Cases of Sweating treated with half-drachm doses of the Agaric.*

NO.	NAME.	SEX	AGE	SYMPTOMS.	PHYSICAL SIGNS.	SWEATING—DURATION AND SEVERITY OF.	TREATMENT.	RESULT.	REMARKS.
IV.	W. S.	M.	58	Cough every winter, not much in summer; expectoration thick, yellow or black; dyspnœa on exertion; hæmorrhage none; lost flesh very little.	Emphysema, bronchitis.	For a week or ten days only; comes on in early morning, and wets things—all over the body.	Pulv. Agar. lar. ʒss. vj. o. n.	Great improvement; began to get better after first powder; quite gone now, even hands dry.	"Worked him very much." No return in a fortnight.
V.	W. S.	M.	63	Cough 6 weeks, with much expectoration; lost flesh very little.	Right—crepitation. Left—rhonchus.	Has had it 6 or 8 weeks every night—very bad indeed.	Pulv. Agar. lar. ʒss. vj. o. n.	Quickly checked the sweating; none at all now.	Purged him violently.
VI.	T. C.	M.	21	Cough nearly 3 months, with expectoration; lost flesh very much; bowels open 3 times a day.	Right—crepitation at apex.	Night sweating all over body; head also wet.	Pulv. Agar. lar. ʒss. iv. o. n.	Did not sweat at all either of the four nights.	Did not purge him; bowels more regular.
VII.	H. P.	M.	34	Cough 2 months, with much vomiting; expectoration; loss of flesh very marked.	Right—crepitation coarse all over.	Very much; almost every night almost wet through.	Pulv. Agar. lar. ʒss. iv. o. n.	Stopped sweating entirely in four nights.	Very little action on bowels. Sweating returned a fortnight later.
	,,	,,	,,	,, ,,	,, ,,	Very severe again all the last week.	Pulv. Agar. lar. gr. xx. —vi. o. n.	Sweating quite gone in 2 nights, and no return.	Opened bowels just enough to be comfortable.
VIII.	W. P.	M.	36	Cough: expectoration: lost flesh—all very much.	Right—bronchial breathing at apex. Left—rhonchus all over.	Night sweating very much last 10 days.	Pulv. Agar. lar. ʒss. vj. i. o. n.	Had great difficulty in taking the powders—they "nearly killed him." The first night it purged him 4 or 5 times. He took it at 10.0, and at 12.0 it "turned him out," and he was up nearly all night—had no rest. Sweating certainly better. Next night took half a powder, and that purged him three or four times. The third night he took a whole powder, and that purged him so much he had to give it up—could not go to bed whole night—"motions ran away from him." Night sweating nearly gone.	

TABLE III. (*continued*).—*Cases of Sweating treated with half-drachm doses of the Agaric.*

No.	Name.	Sex	Age	Symptoms.	Physical Signs.	Sweating—Duration and Severity of.	Treatment.	Result.	Remarks.
IX.	J. W.	F.	36	Cough 12 months; expectoration great deal, off and on 6 months; hæmoptysis, clots at times; lost flesh very much; bowels confined.	Right—crepitation. Left—crepitation.	Night sweating very much last 6 months; almost every night; most distressing. Very severe last 2 or 3 days.	Pulv. Agar. lar ʒss. vj. i. o. n. Pulv. Agar. lar. gr.xx. 7 days. i. o. n. Rep. pulv.	Night sweating much better, but not gone. Night sweating very much better. Check sweating again.	Purged her several times. Opens bowels—not too much. Sweating returned in a week.
X.	M. B.	F.	31	Cough nearly a year, with much expectoration; hæmorrhage 2 days ago for first time; O½. bright red; bowels regular.	Right—crepitation. Left—crepitation.	Night sweating 1 month; every night in the early morning all over the body, head and all, just as if she had been in a bath.	Pulv. Agar. lar. ʒss. 7 days. i. t. d. s.	No night sweating at all after took the powders.	Powders made her very sick, and "worked her very much." For last 3 days could take only 2 powders a day. No return 5 weeks.
XI.	R. S.	M.	42	Cough 2 months, with expectoration; loss of flesh not much; well nourished.	No crepitation; dull and deficient movement right infra clav.	Not very much sweating at night, but very much at his work. Is a farrier.	Pulv. Agar. lar. ʒss. 7 days. i. t. d.	Does not sweat at all at his work now.	Purged him so much could not take them more than twice a day after first day.
XII.	W. B.	M.	37	Little winter cough.	Chronic bronchitis.	No night sweating; sweats much at work. Is a blacksmith.	Pulv. Agar. lar. ʒss. 7 days. i. bis. die.	Does not know what effect they had on the sweating.	Took 2 powders, but would not take any more—purged him so much that he could not take more.
XIII.	P. P.	F.	50	Heats and flushes, followed by perspirations.	Chest sound.	Sweatings after the flushes; often very profuse.	Pulv. Agar. lar. ʒss. o. n.	No better.	Powders purged her, and made her vomit—purging "began at 3 o'clock in the morning, and lasted all night."

TABLE IV.—*Cases of Sweating treated with the Agaric in twenty-grain doses.*

No.	Name.	Sex	Age	Symptoms.	Physical Signs.	Sweating—Duration and Severity of.	Treatment.	Result.	Remarks.
I.	J. B.	M.	43	Cough 5 or 6 years; expectoration; losing flesh; bowels regular.	Coarse rhonchus all over both fronts; no dulness.	Fortnight every night "sopping wet."	Pulv. Agar. lar. gr. xx. 7 days. j. o. n.	Night sweating very much better—nearly gone.	Slight action on bowels. No return of sweating 3 weeks.
II.	R. W. H.	M.	31	Cough; hæmorrhage; expectoration; very weak; in bed the whole week; only gets up to come to hospital.	Right—cavity. Left—cavity.	Most profuse every night.	Pulv. Agar. lar. gr. xx. 7 days. j. o. n.	Very great improvement—not gone, but better.	Powder made him very sick one night.
III.	G. S.	M.	8	Cough 6 months; came on after scarlet fever.		Every night last 3 weeks all over body.	Pulv. Agar. lar. gr. xx. j. alt. noct.	Much better—sweating now very slight.	Great difficulty in getting him to take them, but no purging.
IV.	L. B.	F.	23	Cough 3 months, with expectoration; loss of flesh.	Right—deficient movement, high pitched, little crepitation under clav.	In the early morning, about 3 o'clock. Has had it 3 months.	Pulv. Agar. lar. gr. xx. vj. j. o. n.	Almost ceased—a very great improvement.	Difficult to take, but did not purge her.
V.	H. McG.	M.	26	Cough 7 or 8 months, and all last winter; expectoration very much; hæmorrhage 2 months ago, freely.	Left—dull crepitation.	2 years ago had night sweating most profusely, used to wet right through the bed. Last fortnight very bad again about twice a week, just as if had been in a bath of water.	Pulv. Agar. lar. gr. xx. vj. j. o. n.	No sweating at all—better in every way.	Powders worked him very freely. In subsequent attack took extract of physostigma with benefit to sweating.
VI.	J. T.	M.	35	Came on quite suddenly about a month ago; cough, with expectoration; lost flesh very much.	Right—crepitation at apex.	Last fortnight very much every night—shirt wet right through.	Pulv. Agar. lar. gr. xx. ℳvi. j. o. n.	Quite gone in four nights.	No purging. No return of sweating a fortnight later.
VII.	G. G.	M.	37	Cough 8 months, with much expectoration; so weak that falls down if tries to walk; much emaciation.	Right—cavity. Left—crepitation.	Last 3 months almost every night, some nights more than others—leaves a mark on the sheet where he lies.	Pulv. Agar. lar. gr. xx. ℳvi. j. o. n.	A little better, but not gone yet.	Did not purge him.

TABLE IV. (*continued*)—*Cases of Sweating treated with the Agaric in twenty-grain doses.*

No.	NAME	SEX	AGE	SYMPTOMS.	PHYSICAL SIGNS.	SWEATING—DURATION AND SEVERITY OF.	TREATMENT.	RESULT.	REMARKS.
VII.	continu	ed	......	....	....	....	Rep. 7 days.	Sweating decidedly better—still enough to wet night shirt, collar, and sleeves, but not enough to leave impression on bed now. Has the sweating about every alternate night.	No action on bowels.
	,,	,,	,,	,, ,,	,, ,,	,, ,,	Rep. 14 days.	For a fortnight patient was almost free from sweating. The powders suited him admirably. Then suffered much from vomiting after cough, and rejected everything, including powders — sweating then returned.	Patient very much weaker—unable to take any food. Emaciating very rapidly. Gave him small picrotoxine pills, which checked to some extent both sweating and vomiting.
VIII.	H. P.	M.	28	An old case of $\phi\theta$; has been attending at hospital for over 2 years.	Crepitation at both apices, but very limited in extent.	Has had attacks of sweating frequently, and then long intervals of freedom. This time for a fortnight, every night.	Pulv. Agar. lar. gr. xx. vi. j. o. n.	Sweating very much less—nearly gone.	Powders discontinued, and sweating returned in two days as bad as ever.
	,,	,,	,,	,, ,,	,, ,,	Has had sweating 5 nights this time.	Rep. pulv. vi.	Sweating not much better till he had taken the whole of the 6 powders—none last night, quite comfortable.	
	,,	,,	,,	,, ,,	,, ,,	,, ,,	Rep. pulv. vi.	Quite free from sweating the whole week.	Sweating returned again a week after powders were discontinued.
	,,	,,	,,	,, ,,	,, ,,	Sweating again last 4 nights very severely.	Rep. pulv. vi.	Stopped sweating in 3 nights.	No return of sweating in 3 weeks.
IX.	C. C.	M.	37	Cough 3 months, with much expectoration, thick, yellow; dyspnœa very great on exertion; lost flesh very much.	Right—dull crepitation.	Very much at night last 6 weeks—chiefly in early morning. Wet through.	Pulv. Agar. lar. gr. xx. vi. j. o. n.	Checked sweating very promptly—much better.	Had some difficulty in taking powders, but they did not purge him.

TABLE IV. (*continued*)—*Cases of Sweating treated with the Agaric in twenty-grain doses.*

No.	Name.	Sex	Age	Symptoms.	Physical Signs.	Sweating—Duration and Severity of.	Treatment.	Result.	Remarks.
X.	M. A. W.	F.	28	Cough 4 months very severe, especially at night; expectoration very much; often vomits after cough.	Right—dull crepitation. Left—crepitation.	Last fortnight most severe — every night wet through.	Pulv. Agar. lar. gr. xx. vi. j. o. n.	Very much better—very nearly gone.	Had great difficulty in taking powders—made her sick three times.
XI.	J. T.	M.	18	Cough; expectoration; lost flesh 6 months; badly fed.	Left—dull crepitation at apex front.	Sweating every night for the last week just as if you had thrown a bucket of water over him.	Pulv. Agar. lar. gr. xx. xiv. j. o. n.	Decidedly better — did him much good.	Purged him a little.
XII.	A. G.	F.	46	Cough; expectoration 8 months; with loss of flesh very much.	Crepitation at both apices.	Since cough came on very frequently, generally about 5 in morning, and lasts till 9 when she gets up.	Pulv. Agar- lar. gr. xx. xiv. j. o. n.	Much better after first 2 or 3 nights — now nearly gone—little still left.	
	,,	,,	,,	,, ,,	,, ,,	,, ,,	Pulv. Agar. lar. ʒss. vii. j. o. n.	Sweating now quite gone.	Powders purged her very much.
XIII.	M. S.	F.	21	Cough 12 months, with much expectoration; hæmoptysis little at times: lost flesh very much.	Right—cavity. Left—cavity.	Night after night for many weeks most severe.	Pulv. Agar. lar. gr. xx. vii. j. o. n.	Very little except one night, when, in spite of powder, was very bad.	Had previously had physostigma extract in doses of gr. $\frac{1}{10}$—checked sweating decidedly.
XIV.	A. G.	M.	9	Cough 12 months, with expectoration and loss of flesh.	Right — dull defined movement.	Last 3 months almost every night—all over the body—runs off him, and the bedclothes steam with it.	Pulv. Agar. lar. gr. xx. vii. j. o. n.	Sweating no better.	Purged him very much.
	,,	,,	,,	,, ,,	,, ,,	,, ,,	Rep. pulv.	Not so much at night, but pillows and sheets still quite wet.	Still purged very freely.
	,,	,,	,,	,, ,,	,, ,,	,, ,,	Rep. pulv. bis die.	Still further improvement, but not gone.	Weakened by the purging. Finally gave cod liver oil and extract of malt in addition to agaric, and sweating then at once ceased.

ECLAMPSIA WITH HOOPING-COUGH.

BY E. L. DIXON, M.D., M.R.C.P.

The following case of eclampsia, which may be interpreted in different ways, seems to be worthy of record.

On 14th April last I was called to see a boy four years old, who had been suddenly taken ill the day before, apparently from exposure to cold. He had enjoyed very fair health, with the exception that he had had two or three attacks of catarrhal laryngitis and also a convulsion from some exciting cause on one or two occasions. Once or twice within the past month he had been noticed to squint. His parents and their relatives were strong and healthy, and by no means of a neurotic diathesis. I found he had a very bad cough, and there was coarse crepitation posteriorly over both lungs. In a day or two the signs of lobar pneumonia of the left base were unmistakable—dulness, bronchophony, and crepitation; collapse being precluded by the high temperature and moist sounds. On the 15th he vomited: this was attributed to the ipecacuanha wine which he was taking in five-drop doses, and it did not recur. On the 16th he began to have violent attacks of restlessness and screaming. On the 17th I saw him in one of these paroxysms, which came on with a sudden and violent fit of coughing. The child thus seized at once jumped up from the recumbent to the sitting posture, threw his body and arms about with such power that he was with difficulty kept in bed, striking with his right arm especially, and screaming acutely at intervals. The attack lasted two or three minutes, and rather suddenly subsided. When the violence was at its height, I noticed that the pupils became widely dilated; there were also in some paroxysms squinting and carpo-pedal contractions. A mild attack reminded me somewhat of the violent restlessness of hydrophobia in the child. The interval was sometimes only a few minutes, sometimes half an hour or longer, especially when the patient was under the influence of chloral. There was no heat or congestion of head, or any complaint of headache, nor was there any delirium at any time; the urine was free from albumen. At the end of a week from the beginning of the illness the convulsive attacks had materially diminished in severity and frequency, and they had ceased about the 25th, although there was again a threatening of screaming on the 28th. The cough however continued, and there were coarse crepitation, increased vocal resonance, and impaired percussion-note at the right base behind, with rhonchi in other parts of the chest. About the 4th May, that is three weeks from the beginning of the illness, there was heard a distinct hoop; and all doubt as to its nature was precluded by his brother and his aunt shortly after exhibiting the ordinary phenomena of hooping-cough. The physical signs of disease gradually disappeared; and at the beginning of June he had quite lost his cough and had regained strength.

The interest of this case depends upon the nature and the cause of the convulsions. That the attacks were of an eclamptic character I think there can be no doubt, from the occurrence of the widely dilated pupils at the height of a paroxysm. They were not accompanied with spasm of the glottis, for the respiration could be heard in the chest during the attack; there was no lividity, and there was no crowing sound at the end of the fit. Meningitis seemed to be excluded by the absence of heat of scalp, of delirium, of vomiting, and of irregular pulse. It is not likely that they were sympathetic of the pneumonia, for the inflammation though marked was not extensive, the dulness extending only from the spine to the angles of the ribs and half way up the left posterior chest; it rather resembled the "stripe pneumonia" of Steffen. Moreover, frequently recurring convulsions produced by pneumonia generally terminate in fatal coma. The most likely explanation would seem to be that they were dependent upon the existence of the poison of pertussis in the system, the pneumonia favouring the production of such violent manifestations. The cough was literally a *tussis* *convulsiva,* for it was accompanied with, though it did not seem to cause, convulsions.

A case like this may give some support to the theory, not yet universally accepted, that the poison of hooping-cough acts especially upon the nervous system. This poison, like that of other zymotic diseases, consists probably of living organic particles, and will I have no doubt be before long demonstrated to the eye as existing in the bronchial secretion, in the same way as the tubercle bacilli have been by Koch. Its mode of action may be either directly through the blood upon the nervous system, or in a reflex manner from the surface of the air-passages in which the germs have effected a lodgment. The decisive hoop in this case, reckoning from the beginning of the illness, appeared comparatively late.

Bromide of potassium was given freely, and also chloral so as to cause sleep, and their effect seemed to be advantageous. During the height of the very distressing attacks, when he was occasionally fully under the influence of chloral, it became difficult to get him to take sufficient food. Some one then suggested that he should be tried with an infant's feeding-bottle; this answered admirably, so that he was enabled, though somnolent, to take a fair amount of milk with a little brandy in it; an occasional teaspoonful of Brand's essence of beef was also given. When he became more conscious, he rejected with scorn the teat. For the hooping-cough, the spine was rubbed with the linimentum terebinthinæ aceticum; and he took the tincture of belladonna, up to ten-minim doses three times a day, without any effect upon the pupils or the throat. Quinine in large doses was not tried. Acting on the theory that the disease depended upon a *contagium vivum,* an attempt was made to get him to inhale carbolic acid, but it could not be carried out; and that remedy could only be employed by impregnating the atmosphere of the room in which he was. He was also sent on one occasion to the gasworks to breathe the air of the purifying chamber; but the experiment was not favourable in its immediate results, and it was not repeated. The patient was favoured by the warm weather which prevailed; and whether the treatment had any effect upon the duration of the hooping-cough, which was comparatively short, I cannot determine.

The following numerical observations were taken during the progress of the case :—

April	Temperature.	Respirations.	Pulse.
14	104°	48	160
15	103°	48	150
,, vesp.	101°·5	40	128
16	103°	60	120
17	103°	60	135
18	102°·2	70	140
20, vesp.	104°	80	135
21, vesp.	102°·4	60	150
22		60	126
, vesp.	99°	56	110
23		48	96
,, vesp.		54	120
24	97°·4		105
28		36	96

CHRONIC DYSENTERY.

BY C. R. FRANCIS, M.B., M.R.C.P.

Formerly Principal and Professor of Medicine, Calcutta Medical College.

GENERAL D., aged 58, a retired Indian officer, consulted me, early in 1881, on account of a tendency to chronic dysentery. He had twice suffered from the disease, during the last six years of his service in India, in its acute form; but on the whole, throughout a period of thirty-seven years, his health, with this exception and an occasional mild attack of fever, had been good. Ever since his return to England he had been troubled with irritability of the bowels;—frequent diarrhœa, straining at stool, and occasionally passing mucus and blood. He had been under medical treatment three separate times for these symptoms; and each time had improved, he said, under the ipecacuanha plan. But relapses soon followed, the improvement being only temporary; and, when General D. consulted me, he had become very thin. When I first saw the General his system was considerably below par. Naturally of a lively disposition and full of fun and anecdote—he had led an active life in India — he was now comparatively "down." The countenance was sallow; and though, when well, a good specimen of the Indian officer, who may usually, it is said, be recognised by the description "erect, bronzed and gentlemanly," he now looked quite the worn old Indian—prematurely aged.

Symptoms.—There would be four or five loose stools, sometimes more, in the twenty-four hours; of a lightish colour with occasionally a little blood; and sometimes straining. There was no appreciable tenderness over any part of the abdomen. The tongue was pale and the conjunctivæ had a yellowish tinge. The appetite was capricious, and there would often be the sense of fulness after eating, and now and then flatulence. Although evidently ailing, he went about making calls and taking trips to London. He had great pluck, and would not given in.

Pathology.—Doubtless the intestinal canal was, in more or less of its length, anæmic and irritable. There was no evidence of a lesion in any part of it, not even congestion. The muscular coat of the bowel required tone, and the liver was sluggish.

Treatment.—General D. was very much afraid of ipecacuanha being again "poured in"; as, when given in previous attacks, it had made him feel so exceedingly "seedy" for some time afterwards. I told him that whatever may have been the necessity before, there was none then; and I ventured to predict that, provided he would adhere strictly to the injunctions given, he would soon get well without it. The staple treatment consisted of very careful dieting, and for the first two days of absolute rest in the recumbent position, supplemented by a modification of Twining's pill. This pill is found, in India, to be well suited for chronic dysentery with or without lesion, and I have used it with equal advantage for similar cases in England. Twining's pill consists of ipecacuanha, blue pill (?), extract of gentian, with hyoscyamus or opium—one or two grains of each ingredient according to circumstances. The ipecacuanha restores healthy action to the follicles, promoting their secretion; the gentian gives tone to the muscular coat, whilst the anodyne tranquillises the entire bowel and prevents griping.

Blue pill is added, or not, according to the state of the liver, and in tractable cases apparently answers well enough; but in others, where the organ is obstinately inactive, the best mode, I believe, of getting it to work is that introduced by Dr. (afterwards Sir J. Ranald) Martin.

Acid nitro-hydrochl. dil. ♏ viii. ad. ♏ xv.
Aquæ, ʒ ij.

Tincture of orange-peel may be added in ʒ i. doses, and the efficacy of the acid is much increased by gr. v of extract of taraxacum. I am in the habit of prescribing this draught to be taken a few minutes before each principal meal, as I have found when thus taken that it is apparently efficacious in promoting digestion, which is usually, in some form or other, defective. I think that nux-vomica might sometimes be substituted for the gentian with advantage, and had the General not improved so rapidly I should have prescribed it. Astringents often, I believe, do more harm than good, especially where, as in General D.'s case, there is no lesion. When I first saw him he was taking sulphate of copper, which had been prescribed by a medical practitioner before he came to me. Without making any impression upon the dysentery, it evidently irritated and heated the lower bowel. Doubtless, where there *is* lesion, astringents would in many cases prove of use, if one could be sure of their always acting upon it (whether introduced by the mouth or by the aid of an enema), as we should apply an ointment, a liniment, or a lotion to an ulcerated or otherwise injured surface on the skin. We are careful, in such cases, to first cleanse the surface, when necessary, by poultices or washing; and, from time to time, to remove any morbid product that may be adherent. We cannot do this in the intestines. All who have had experience in making post-mortem examination of fatal dysenteric cases will remember the necessity for repeated washing of the diseased part before the essence of the morbid condition can be sufficiently well exposed to view. If this be so in the dead body, how much more difficult would it be to obtain a perfect cleansing before we brought astringents to bear on a particular spot in the living? In the treatment of tapeworm, too, it is desirable to first pave the way for the anthelmintic. For some time before giving it the practitioner causes the patient to take only fluids, such as tea and the like; so that there may be no protection to the worm from solid food, or excrementitious or other matters. After this preliminary treatment there is nothing between the animal and the cure, which, as a rule, when so applied destroys it *in toto*, and head and all are then expelled together.

Again, *all* cutaneous ulcers do not benefit by astringent applications—at any rate not till opium or some other anodyne has been largely added. Occasionally we meet in certain constitutions with cases of ophthalmia, where the mucous membrane is irritated by whatever is not essentially soothing. So, in lesions of the intestinal mucous membrane, a similar mode of treatment would, in such cases, be required. Practitioners in India are familiar with cases of chronic irritable ophthalmia amongst the natives, where the conjunctiva resents the contact of even the simplest astringent; whilst recovery rapidly follows the application of an ointment of alum, the extract of berberry,[1] and opium round the eye, outside. The objection to it is the startling[2] appearance it gives the patient. Similarly, where there is congestion in the intestinal tube, evidenced by tenderness (revealed by firm pressure over certain spots)—the stools being slimy and bloody at the same time—counter-irritation is of especial value in such constitutions. Small flying blisters repeatedly applied are best for the severer cases; whilst turpentine stupes covering the entire front of the abdomen, or iodine paint, suffice for those of a milder form. The lighter the application intended to cover the abdominal surface in this and similar conditions the better. Where dry warmth only is required, it is best obtained by heating a flannel bag filled with bran. I venture to think that very frequently, where an astringent has been credited with the cure in a case of chronic dysentery with ulceration, the result was in reality due to the opium or other anodyne with which it was combined. Preparations of chalk do good, I believe, in the case of irritative discharges from the bowels, by protecting the mucous membrane from contact with them. There is one so called astringent in which I have, in common with most practitioners, great confidence, viz. bael.[3] But *it* acts more as a regulator of the intestinal canal, being useful in preventing constipation as well as controlling diarrhœa. Unfortunately, we must be content in this country with the extract or tincture prepared from the dried fruit; and even in India—the fresh fruit not being available all the year round—those who being subject to diarrhœa make bael an article of their daily diet, store it up in large quantities for future use. Now that the value of bael is becoming generally known, it is frequently seen on the European breakfast-table as a jam prepared from the fresh fruit: and those who use it bear testimony to its efficacy. It keeps their bowels in order, they say. It would be well if our European soldiers, who frequently supply their messes with palatable extras, could be induced to add bael jam to their other "little comforts." In a country where bowel complaint is so rife and attended with such serious consequences, the introduction of so pleasant and handy a remedy, preventive as well as curative, becomes almost imperative.

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[1] (Vern.) Rusot (a watery extract of berberry, which is common
in the Himalayas), ʒj.
Alum, gr. xx.
Opii, gr. x.
This forms an ointment capable of being easily smeared round the eye.

[2] Notwithstanding, a European lady, for whom I had prescribed it in India, lamented the difficulty of getting it on her return to England when again attacked with ophthalmia.

[3] *Ægle Marmelos.* Essentially a tropical fruit, and common in Bengal proper. Syrup of bael is prepared by mixing the interior of the fresh fruit, divested of its stringy part, in a couple of wineglassfuls of water, and adding two teaspoonfuls of sugar. Half this quantity may be taken three times a day in simple uncomplicated diarrhœa.

So much has been written in favour of astringents generally in the treatment of chronic dysentery by able practitioners in India and other countries, that it may seem presumptuous in me to offer an adverse opinion with regard to some of them. But I write from experience. Others, as well as myself, must have been frequently disappointed, when prescribing them in this disease (as well as in diarrhœa), at the unsatisfactory result; which was probably owing to one or other of the causes I have mentioned. The difficulty of reaching with an enema an ulcerated surface in the intestines, if situated high up, has long been recognised; and a well known and able medical officer some years ago advocated the use of a long flexible tube, which was to be boldly introduced into the rectum and passed along the curves of the colon even up to the cæcum! I am not aware that the proposal has found favour with the profession generally. Independently of the possible injury that might be inflicted on the mucous membrane—even if there were no greater mischief—*en route*, there would be no certainty of the diseased surface being reached and *thoroughly* acted upon. Of course, in hæmorrhagic dysentery, powerful astringents must be given, as well by enema as by the mouth. They become then almost our sheet-anchor. The principal difficulty that we have to contend with in disorders of the bowels requiring absolute rest is the peristaltic action. In acute dysentery, where there is much congestion rapidly advancing to inflammation, or where there is an ulcerated surface, we can expect but little benefit so long as this movement continues in full force. We, therefore, endeavour to subdue it with large doses of ipecacuanha which, by its diaphoretic and gently cathartic properties—vomiting, though not essential, often favours the end in view—equalises the circulation, and decidedly reduces the peristaltic action.

In all cases of dysentery, whether acute or chronic, where there is ulceration, this action must be reduced to a minimum. The point is of less importance in a case of chronic dysentery like the one under review, where the main object is to soothe and give tone.

In all cases a suitable diet is of the first consequence. The food should be not only bland and nourishing, but capable of ready and quick absorption, as little excrementitious matter as possible being left. This last consideration should never be lost sight of. It is obviously of paramount importance where there is any lesion. I have never met with anything that so satisfactorily fulfils these requirements as strong simple soup, or broth, thickened[1] with arrowroot, or sago, or tapioca, or—best of all—with cornflour. This combination seems to have, moreover, an astringent property. Did space permit, I could tell of scores upon scores of cases of diarrhœa, especially in children, that have done well—more than one, too, after all hope of recovery had been abandoned—under this treatment alone. And the mode of administering the diet is far from being unimportant. The quantity given each time (the exact amount will depend upon age and other circumstances) must never exceed, in the adult, a small teacupful. This may be repeated at varying intervals. Every three or four hours is, in my experience, a good average period. Children (I am not speaking of infants) may need it more frequently. No other food of any description whatever should be given; and, for drink, barley-water slightly sweetened—(some put salt instead of sugar)—is best. It must not be flavoured with lime-juice. In scorbutic cases, however, where certain fresh vegetables form part of the dietary, it may be allowed. These details will, to many, appear altogether unnecessary; but I am satisfied, from long experience, that a strict attention to them makes all the difference to the patient. Unlike those who are disposed to ridicule such coddling, as they call it, General D. obeyed my injunction to remain in the recumbent position: and, for an entire day, he even kept his bed; adhering carefully, moreover, to the diet prescribed. He knew what acute dysentery was; and he was well aware how readily it might be lighted up. At the end of forty-eight hours, feeling so much better, he adjourned to the dining-room, and there reclined upon the sofa. In three days the General expressed himself well and wanted more to eat! I then formulated a plan of diet which he has rigidly followed. For several weeks the soup and cornflour were continued: and, besides, he ate only bread and butter, milk, and eggs. Under this system be became "a new man," and now, as I write, eighteen months afterwards, he is in excellent health—better, he says, than he has been since he retired from the service; and in as good condition as ever. He looks well too, and plays at lawn tennis—a dangerous game by the way for one who has so suffered, involving as it does, like other violent and heating games, a risk of being chilled—with all the vigour and enjoyment of youth. I take no particular credit to myself for this result. The treatment was conducted on rational common-sense principles, and the favourable issue was due very much to the patient recognising this fact, and helping to carry the treatment out. In each of his former attacks he had been on the sick-list for ten days and upwards, and had relapsed after all: so that he was determined to give the new plan a fair trial He was rewarded by recovery in a third of the time.

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[1] It is often difficult to persuade patients of the advantage of *combining* the two things. Unless the object be carefully explained and the combination be insisted upon, they would—many at least—be as likely as not to take the soup or beef-tea at one time of the day, and the *thickener* at another.

Remarks.—This case may be taken as typical of simple uncomplicated chronic dysentery, which is apt to supervene in those who have suffered from the disease either in this or its acuter form in a tropical climate shortly after their return from it to a colder one. And, unless great care be taken, these chronic attacks will be apt to recur from time to time under the influence of "chills," which generally discover the weak point. The mucous membrane being anæmic and irritable, and the muscular coat weak, it is clear that the food and fæces should neither be irritating nor excessive. Food is constantly put upon our tables which is quite unsuited to, so to speak, tropical stomachs—leguminous vegetables for example; savoury meats whose original features are well-nigh obliterated by fashionable sauces; pastry in various indigestible shapes; and fascinating salads which, according to well-known, though seldom followed instructions, should only be made to be thrown away! Not only must all such viands be eschewed, and plain, well-masticated food consisting of bread (aërated, I think, is the best) and butter, milk, eggs, fish, with very little but well-cooked animal food, being substituted for it; but the hours for eating should be regulated. The Indian habit of early rising, not before the sun, and a walk afterwards—the system fortified by a cup of cocoa and milk and a biscuit—will probably create an appetite for breakfast at 8 or 9 A.M. An early dinner—the retired Anglo-Indian is not bound by office hours—followed by an early tea, and a really light supper, will be found to conduce more to health and long life than late rising and late breakfast; hot luncheons, and heavy dinners taken to bed, which produce, not refreshing slumbers, but, it may be, horrible dreams at night and unavailing self-accusation in the morning.

The patient may find it necessary to eliminate altogether one or more articles from the diet prescribed, or to partake of them only now and again, and then but sparingly; eggs, for example, and some kinds of fish; but this necessity he will discover for himself. He will also learn what beverages suit him best. Tea is nerve-exciting; coffee is heating; and cocoa fattening, though often indigestible. These are the properties assigned, with more or less truth, to each respectively. I presume that, in most cases, either of them, taken in moderation, would agree. I usually recommend coffee for breakfast, tea at the evening meal, and cocoa at supper. But here, again, the patient must be guided by his own experience. The early morning cup of tea required in India with a biscuit or piece of bread and butter preparatory to the early morning's work is not needed in England, except in the case of an antematutinal walk, when, however, cocoa, as being more sustaining, is best. Alcohol is not, I believe, required at all. Some believe that they are better with a little claret: others with weak brandy, or whisky and water, in either case taken at dinner. Beer is quite out of the question.

In selecting a *residence*, also, health is too often the last thing that is considered. Where one who has suffered from dysentery in India, and who is consequently more or less liable to it in England, is at liberty to live where he pleases, I should recommend, *cæteris paribus*, the seaside ; at any rate for the first year or two, or longer, after his return. There is a good choice of climate on our own coast without leaving home to seek for one. The particular locality should be left to the patient's medical adviser : but it may be stated generally that, for the Anglo-Indian, a medium climate is best : and even amongst these there is variety. A cold, damp climate is especially to be avoided.

ANATOMICAL AND EXPERIMENTAL INVESTIGATIONS MADE DURING THE YEARS 1868-69, RELATING TO THE COMMUNICATION OF TUBERCLE BY INOCULATION, AND THE PATHOLOGICAL NATURE OF THE LESIONS RESULTING THEREFROM.

BY J. BURDON SANDERSON, M.D., F.R.S.

(*Continued from* p. 278.)

5. *Appearances observed in the Kidneys.*

Of the 21 animals one only exhibited morbid changes in the kidney. In this case the lesion consisted in the existence of two or three nodules as large as hemp-seeds in the cortical substance. These were of firm consistence, and in their microscopical characters resembled those found in the spleen. They were not examined with the microscope.

6. *Appearances observed in the Internal Lymphatic Glands.*

In all cases in which there was disease of the thoracic or abdominal viscera, the internal lymphatic glands were found to be affected. The alteration consisted in enlargement and induration, with caseous degeneration. Neither suppuration nor softening were observed in a single instance. The degree in which the several groups of glands were enlarged appeared to be invariably dependent on the extent and progress of the morbid changes which had taken place in the organs from which they received their tributaries. In those cases in which the lung, for example, remained healthy, although other organs were diseased, the bronchial glands were also found in a natural condition; but in cases like Nos. 21 and 22, in which by far the greater part of the parenchyma of the lung was the seat of interstitial induration, the bronchial glands formed a mass in the upper part of the thorax, consisting partly of the indurated and enlarged organs themselves, partly of condensed cellular tissue, by which the vessels and other organs contained in the posterior mediastinum were matted together. In a similar manner the size and hardness of glands in the gastro-hepatic omentum afforded a sure indication of the state of the liver, with which in the more advanced cases they were connected by a cord of induration. The agminated glands of the small intestine, and particularly the large patch which is always found close to the ileo-cæcal valve, appeared to me to be usually healthy. Sometimes the follicles were enlarged, in which case enlargement was also found of the corresponding mesenteric glands.

[The lymphatic glands are subject to two distinct morbid alterations in tuberculized animals, both of which were referred to in my former report as affecting subcutaneous and internal glands respectively. The subcutaneous glands (see p. 197) are affected only secondarily, that is, in consequence of local changes going on at the seat of injury, consequently none of them become diseased excepting those that receive tributaries from diseased parts. The morbid changes produced are more or less acute, and lead to softening and suppuration. The alteration consists in enormous and rapid enlargement of the organ, consequent on multiplication of cells. The alteration appears to affect all the parts of the gland alike, but does not in its early stages alter its structure. It may be said to consist primarily mainly in congestion, and in the multiplication of cells in such enormous numbers as to destroy the consistence of the gland. . . . In the meantime the capsule of the organ becomes thickened by the interstitial development of new connective tissue, within which may usually be found a layer of gland-substance, which instead of softening has undergone the gradual process of induration to be immediately described.

In the internal lymphatic glands the origin of the morbid alteration is always tertiary—that is to say, it is a consequence of secondary disease existing in the organs from which they receive their afferents. These alterations are chronic in their character, and are never attended with softening. I have studied them principally in those glands which receive the lymphatics of the liver, and are situated in the *ligamentum hepaticoduodenale*, close to the portal vessels. The changes observed are of the following nature. In the early stages nothing is seen excepting that the alveolar reticulum is perhaps somewhat coarser than it should be. All the constituent parts of the organ can be readily distinguished from each other, and the lymphatic sinuses seem to be pervious and in a natural state. The further progress of the alteration is marked by the diminished distinctness of the structure. It becomes more and more difficult to distinguish the alveoli from the trabecular tissue by which they are separated from each other. This appears to arise from two distinct processes. In the first place, cells are developed in great numbers in the fibrous tissue which constitutes the external capsule of the organ as well as the septa or partitions which separate the alveoli from each other. These cells differ from the ordinary lymph corpuscles in their larger size, and in the fact that most of them are distinctly nucleated. They are arranged in round or oblong groups enclosed in the meshes of the fibrous tissue, or more properly speaking, in cavities which they have made for themselves. In this way the trabecular tissue loses its natural compactness, and assumes the character of a spongy reticulum, the interstices of which, however, are much larger than in that of the alveoli. In the ampullæ a change occurs which at first sight appears to be of an opposite nature. The slender fibres of the alveolar reticulum become coarser. Towards the centre of the ampullæ this thickening seems to affect all the fibres equally, so that a fine network of threads is converted into an equally fine network of transparent cords, the holes of which, notwithstanding the general enlargement of the whole mass, are much smaller than they were before. Towards the surface of the ampullæ the process consists in the formation of irregular bands of fibrous material traversing the original tissue at various distances and in various directions, by which the lymph spaces are obliterated and the whole converted into a coarse sponge, and thereby assimilated to the altered cortical tissue with which it is continuous. All this might be expressed more shortly but less completely by saying that the whole of the medullary part of the gland becomes the seat of fibrous degeneration, which, while it principally affects the dissepiments, extends from them to the alveoli, converting all the affected parts into a fibrous sponge in the interstices of which are contained cells usually larger and more distinctly nucleated than lymph corpuscles.

Up to this point the altered gland tissue is still supplied with blood, for in specimens of which the arteries are injected it may be seen to be pervaded with vessels in all directions. The vascularity, however, is I believe confined to the trabecular tissue, for the fibrous degeneration of the fine tissue of the ampullæ necessarily involves the obliteration of its equally delicate capillaries, or rather their conversion into fibrous bands indistinguishable from the rest of the tissue. The part which the corpuscles take in this process of fibrous transformation must, I venture to think, be exceedingly subordinate. In the ampullæ the natural lymph cells totally disappear, so that in those parts of the gland in which the fibrous change is most complete there are no cells whatever, as one may easily satisfy oneself by the examination of unpencilled sections. In those parts where there are still heaps of cells contained in the meshes of the sponge, these appear to have nothing to do with the development of the fibres which surround them. The ultimate result of the process is caseation, *i.e.* slow necrosis. The fate of the cells is to die, of the fibres to become opaque and granular. . . .

The changes which occur in the spleen correspond so closely with those observed in the lymphatics, that they scarcely need a separate description. The development of the disease is divisible into two stages. It begins, as in the lymph glands, by a rapid cellular proliferation, in consequence of which the organ increases enormously in size. The multiplication of cells occurs, as I stated last year, principally in the Malpighian corpuscles, in consequence of which these bodies become unnaturally prominent and obvious, and assume in every respect the character and appearance of miliary tubercles. By the overcrowding of the cells the blood-vessels are compressed, so that the central parts become anæmic and undergo caseous degeneration. Eventually the spleen undergoes a fibroid degeneration, the character and results of which are similar in every particular to those already described in the lymphatic glands. The pulp and the Malpighian corpuscles, which in the guinea-pig are remarkably well developed, especially underneath the convex surface, and form by far the greater part of the bulk of the organ, soon become indistinguishable. This blending of dissimilar types of structure takes place just as in the lymphatic glands. On the one hand the capsule is everywhere thickened, and here and there bulges out into nodular prominences in consequence of the irregular growth of groups of cells of the interstices between its fibres, while on the other bands of newly-formed fibrous material spread in every direction through the pulp. The final result of the transformation resembles that which I have already described so closely, that if it were not for the more regular arrangement of the trabeculæ it would be impossible to discriminate between sections of the two organs.]

7. *Appearances observed in the Peritonæum.*

These appearances can be best studied in the mesentery and in the gastro-hepatic omentum. They were met with only in a small proportion of the animals examined. On spreading the diseased membrane on a plate of glass it can be made out even with the naked eye that its surface is scattered with minute granulations; and on examining the specimen under a low power it at once becomes manifest that these granulations have a special relation to the vascular branches, and are only to be found in their immediate neighbourhood. The nodules are round or oval, and vary indefinitely in size. I have seen none which exceeded a large pin-head in diameter, while others are so small that they can only be discovered by the microscope. Here and there they are so numerous that the vessels resemble, as seen by transmitted light, necklaces of dark beads, some of which look as if they were strung on the vessel, others as if they were attached to one side of it.

The relation between these granulations and the vessels can be easily understood if it is borne in mind that all the larger mesenteric and epiploic arteries, along with their accompanying veins and nerves, are enclosed in cylindrical sheaths of areolar tissue loaded with fat cells. It is in these sheaths that the granulations are situated, hence it follows that they lie among the fat cells, and are in contact with them. Around the smaller vessels the areolar sheath cannot be distinguished from the adventitia, and hence the nuclear proliferations with which they are encrusted look as if they formed part of the vascular wall.

[By more minute and careful examination I have since learnt that these visible granulations are strictly speaking not new growths but overgrowths, and that they originate by the enlargement of previously existing organs, not by the development of any heterogeneous structure. . . . The omentum of the guinea-pig consists in its most transparent parts of two layers of epithelium, enclosing a regular network of connective fibres, the meshes of which are remarkably uniform in size, measuring about $\frac{1}{400}$ of an inch. The epithelium is formed of cells with wavy outlines, each containing a spheroidal and finely granular nucleus. These cells cling closely to the fibres of the network, never extending over the empty spaces between them, in consequence of which the nuclei project visibly from the surface. The relation of the arteries and veins to these two essential elements of the structure, viz., the epithelium and the network of structureless transparent fibres, differs according to their size. The smallest vessels, whether venous or arterial, are in immediate contact with the epithelium. The vascular wall is connected on either side with the fibres of the network, with the substance of which it appears to be intimately blended. The larger vessels are enclosed in sheaths, of which, although they vary considerably in their structure according as they are studied in the omentum or in the mesentery, two principal varieties may be distinguished, those which contain fat cells, and those which consist entirely of adenoid tissue. . . . Vessels of size intermediate between those last described and capillaries lie in a mass of adenoid pulp, which sometimes forms a tubular sheath of uniform diameter, sometimes projects from the serous surface in the form of fringed appendages, extending along the course of the vessel, or spreading out between the epithelial layers. . . . The adenoid nodules previously referred to as existing in the normal omentum are either mere aggregations of cells, between the opposed layers of epithelium, not supplied with vessels, or collections of cells around loops or more complicated "labyrinths of capillaries. In intimate structure the vascular sheaths and isolated masses are alike. All are collections of lymphoid corpuscles embedded in an extremely delicate reticulum and covered with epithelium, which is continuous with the general epithelial lining of the peritonæal cavity, but differs from it materially" in the minuteness and spheroidal form of its elements. . . . As regards the relation of the adenoid masses in the peritonæum to the lymphatic vessels, I confess myself to be entirely at fault. In applying v. Recklinghausen's method, I have failed to discover any lymphatic channels, nor am I aware that anyone else has met with them in this part of the peritonæum.[1] . . . The resemblance to the adenoid structures of the mucous membranes suggests that they are probably concerned in absorption, and that they stand in the same relation to the peritonæal cavity that Peyer's follicles and the rest of the adenoid tissues of the intestine do to the alimentary canal. The latter view seems probable, from the similarity of the conditions under which they show signs of excited action with those which affect, in a corresponding manner, the lymphatic glands and the intestinal follicles. In animals that have died of acute peritonitis all these adenoid masses become soft, tumid, and enlarged. If the smallest possible amount of tuberculous material, suspended in water, is injected into the peritonæum, these organs undergo a more gradual hyperplasia, and eventually become tuberculous. This delicacy of reaction against an infective agent seems to me to be more easily understood by supposing that the morbid material actually passes through the excited tissue than in any other way. In confirmation of this conclusion I would refer to the following experimental result

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[1] This subject has been since completely elucidated by Dr. Klein. The results of his investigations are contained in a paper published by him in conjunction with the author (Klein und Burdon Sanderson, Zur Kentniss der Anatomie der Serösen Häute, *Centralblatt f. d. med. Wissensch.* 1872, p. 16) in which the relation to the lymphatic system of the "adenoid nodules" of which the first description had been given two years before, was clearly stated. They were subsequently more fully discussed, and illustrated in Dr. Klein's work on the "Anatomy of the Lymphatic System" (Part I. pp. 31—57), which was published in 1873.—J. B. S. 1882.

(March 31st 1869). In three guinea-pigs inoculated 21 days previously, by the injection of a drop of distilled water rendered turbid with pounded diseased lymphatic gland, no lesion was found excepting that the adenoid masses (Knauff's bodies) in the anterior mediastinum were enlarged to such an extent that when the membrane was spread out on a glass plate, they could be readily distinguished without the aid of a lens, as transparent beads.]

(To be continued.)

Reviews.

Manual for the Physiological Laboratory. By VINCENT HARRIS, M.D., M.R.C.P., and D'ARCY POWER, M.A., M.R.C.S. Second Edition. Post 8vo. pp. 214. Illustrated. London: Baillière. 1882.

WE ventured to predict of the first edition of this work that it would be found of much practical service. The new edition is in many respects better and completer than the old: in especial, the section on physiological chemistry has gained in simplicity and definiteness. The characteristic of the book is its essentially practical nature. It tells what is to be done next and how to do it. The fact that it has been elaborated mainly in the class-room and at the work-table ensures its usefulness to students who aim at something more than paper-physiology. At the same time we must not omit to state that without a practised and well-informed teacher, and a careful antecedent study of the larger text-books, the student will constantly find this guide-book inadequate: more inadequate, perhaps, than the authors are aware. It is a handy manual, telling the already instructed student how to apply or verify his knowledge. Where the authors have themselves actually gone before the student and verified or applied what they recommend, they are generally trustworthy. But there are parts which we are sure they have not themselves verified, and then their statements must be taken cautiously. We note a few such points for the benefit of future editions. To harden many tissues in chromic acid, the pieces must be much smaller than "the size of a hazel nut" (p. 6). The anilin dyes on p. 18 (I.) are soluble in spirit as well as in water. More details might well be given with regard to gold, silver, and osmic acid staining, even if less were said about such niceties as anilin, palladium, and molybdate. On p. 26 the processes of washing a section in water and staining it are given in inverted order. The mode of mounting in Canada balsam suggested is not good: by a better mode of handling, the experience of the authors—that "it is almost impossible not to have" air-bubbles—may be altogether avoided. The account of muscle on p. 61 is much too one-sided, and will certainly mislead a student who accepts all the statements as established or even generally received. There is strong evidence here that the writers have not seen themselves what they direct the student to look for. He who wishes to see Pacinian corpuscles well will not follow the instruction on p. 67, but examine them in the fresh state. In studying the glands of the stomach the student will be often disappointed if he prepares his specimens as on p. 77, instead of pinning them out before putting them into alcohol. The comparison of the granules (p. 117) of the pancreas and of the stomach as given rests on a misconception. The account of Grützner's method would not enable any one to follow it out: the standard solution of carmine should be 1: 1000 not 1: 100.

The fact that our points of cavil refer to details only is evidence that the chief principles of the book are good. Faithfully used it will bring needed reality to the physiological teaching in medical schools.

The Student's Guide to the Diseases of the Eye. By Edward Nettleship, F.R.C.S. Second Edition. Fcp. 8vo. pp. 395. London: Churchill. 1882.

This new edition of an excellent handbook embodies several improvements. A brief but clear introduction to the principles of geometrical optics so far as they concern the ophthalmist will be hailed by many a student whose "preliminary scientific" lessons are fading from his mind. The advantage to all readers of having this *résumé* of physical principles thus readily at hand is manifest. A series of tests for colour-blindness is added, with ample instructions for using them. We confidently recommended the first edition: we have only now to congratulate the author on his assured success.

Diseases of the Ear. By George P. Field, M.R.C.S. Third Edition. London: Renshaw. 1882.

We have received the last edition of Mr. Field's work on diseases of the ear, and find it a considerable improvement on the previous edition. The work has been in great part re-written, and all information has been brought down to the latest date, as *e.g.* in the chapter on aural exostoses. The careful and detailed manner in which the treatment of the various diseases has been given is admirable and leaves little to desire. The work would be still more improved, if the opinions of various authors, instead of being given *in extenso*, were concisely stated. Some of the space thus saved might then be devoted to a fuller description of the different diseases.

The Pharmacopœia of the London Hospital. London: Churchill. 1882.

This is not only a pharmacopœia: it is a book full of valuable hints for elegant, simple, and inexpensive prescriptions. It contains besides, diet-tables, directions for note-taking, a list of antidotes, and a number of other little matters. It is, in fact, a complete handy-book for the student of this great medical school. But it is so useful and practical that we have pleasure in recommending it to others who have passed their student days, but who feel the need of a pocket reminder that can be trusted.

Mayne's Therapeutical Remembrancer. London: Churchill. 1882.

This seems to be a re-issue (it is called a second edition) of an antiquated book. Its design is good, for in addition to the ordinary Materia Medica (with uses and dosage) it suggests, for each drug, combinations in which it may effectively be prescribed. But the essential qualification of such a book is that it shall be trustworthy, and up to date. Here we learn that *Potasii bromidum* is used in ascites, enlarged spleen, &c.; *Liquor arsenicalis* in elephantiasis, lepra, &c.; *Ammoniae carbonas* in a number of cases; and so on. The book is interleaved with blank pages for notes: an hour or two's work with a standard treatise might easily make these the most valuable pages of the whole.

The Medical Man's Handy-Book. Shepperson. London: Churchill. 1882.

This is still more useless, because more full of gaps and blunders. It bears no evidence of being the handiwork of a man of practice: rather it has been made up from pharmacopœias and somewhat ancient text-books of pharmacy. We are told that the maximum dose of potassium bromide is 30 gr., of the iodide 10 gr.: and that potassium iodide is incompatible with corrosive sublimate. Mr. Shepperson would doubtless condemn the compound mixture of perchloride of mercury of the London Hospital authorities; they try to combine the "incompatibles" by ordering 5 grains of the iodide to one-twelfth of a grain of the perchloride in a little spirits and water. And we know a good many practitioners unfettered by "Handy-books" who do the same.

An Index of Comparative Therapeutics. Potter. London: Kimpton. 1882.

This is an American combination: it would be scarcely possible in this country. The suggestions for treatment of all kinds of maladies are arranged in parallel columns; the one contains the ordinary medicaments, the other the homœopathic. The first column is very curt, but may be really of value when a hint is needed: it is obviously the result of much labour and some skill. Of the second column we are unable to judge. Mingled with therapeutics we have, in the same alphabetical list, such matters as ethics, fees (here the columns seem no longer in antithesis), obstetric memoranda, thermometry, and urinary tests. A wonderful amount of information, trustworthy so far as we have tested it, is compressed into these small pages. The compression might have been carried further without serious loss if the second columns had been omitted throughout.

The Surgery of the Rectum. By HENRY SMITH, F.R.C.S. Fifth Edition. London: Churchill. 1882.

WE welcome with much pleasure the new edition of Mr. Smith's lectures, but regret that he has been unable to carry out his idea of writing a more complete treatise on rectal disease. Mr. Smith still confines his remarks to a few only of the prominent points of rectal surgery. The treatment of hæmorrhoids by clamp and cautery, so long associated with his name, forms the best chapter in the work. The author is still "convinced of its superiority over the ligature as regards the important element of safety to life." He records three deaths in his last 250 cases; surely this is a rate of mortality as high as, if not higher than, a careful surgeon would expect from the use of the ligature. The chapter on rectal cancer is especially good. Mr. Smith, who formerly condemned the operation of excision, has now so far altered his views as to advise its performance in well-selected cases, and adopts the method recommended by Cripps in his Jacksonian Essay.

Those who wish for information on the treatment of fistula, hæmorrhoids, and stricture, may read with advantage Mr. Smith's lectures; they are the work of a thoroughly practical and successful surgeon.

Clinic of the Month.

Local Etherisation in Strangulated Hernia.—Dr. W. Finkelstein, of Jassy, describes his method of reducing strangulated hernias thus: "I lay the patient on his back, and make him draw up his knees. In inguinal hernia I support the scrotum on a pad or pillow, and pour one or two tablespoonfuls of ether over the integuments of the sac; I then lay over it a cloth folded three or four times. This I repeat every fifteen minutes. After the third or fourth repetition, the coils of intestine become mobile, and sometimes slip back of themselves into the abdomen. If they do not do so I attempt to reduce them gently; and in fifty-four cases out of fifty-eight I have succeeded. I find the treatment more successful the less time is previously spent in taxis: so I apply the ether as soon as possible after the strangulation. It is easy to see why. When the bowel has been nipped for some time, it becomes paralysed and loses its power to contract and to conduct peristaltic movements. Thus your chance becomes less hopeful or is lost. I had no instance of simply omental hernia in these fifty-eight cases. I should think in such a case etherisation would be useless. In cases where the hernial coverings were much thickened it would probably be less effective." To lessen the burning pain produced by the ether, a mixture of 100 parts of sulphuric ether with 20 of oleum hyoscyami is used. The ether must be poured on, not dropped. (*Berl. klin. Woch.* 30, 1882.)

Tuberculous Synovitis of Tendinous Sheaths.—Although tuberculosis has been found in nearly every part of the human body, it does not seem that there has been any distinct proof offered of its presence in the sheaths of tendons. M. Janin, in the service of M. Trélat, at the Hôpital Necker, now publishes a case which he thinks will afford the necessary histological evidence. A female, nineteen years of age, of strumous habit and constant tendency to colds, entered the hospital in December last. She was found to have inflammation of the flexor tendon sheaths of the right middle finger, the tumour, eight to nine centimetres long, extending under the palmar arch. It was completely removed by M. Trélat. A microscopic examination by M. Latteaux showed that it contained nodules, cheesy foci, and giant cells which were held to confirm the diagnosis of tuberculosis. (*Prog. Médicale*, June 19, 1882.)

Idiopathic Salivation in a Child.—Dr. Finlayson, of Glasgow, writes as follows:—Salivation is of very frequent occurrence in children in connection with the process of dentition: in the various forms of stomatitis also, which occur in childhood, the discharge of saliva is very profuse. Salivation from mercury used to be regarded as scarcely to be produced in young children, but this medicine may give rise to its usual effect in them also. Apart from such causes, salivation in childhood is certainly rare. Even in adults the occurrence of salivation, apart from the influence of medicines, or of inflammatory affections of the mouth and throat, must be regarded as an uncommon symptom, although in certain paralytic affections involving the lips there may be much dribbling of saliva, and possibly even an increased secretion of fluid in certain cases. One of the most interesting forms of salivation is that due to pregnancy, where the symptom may be regarded as of nervous origin, and amongst other features common to the symptomatology of pregnancy and Addison's disease, salivation may be mentioned as a rare complication of the latter. (See Meissner, *Case* 14, *Schmidt's Jahrb.* Bd. 126.) In the following case the co-existence of a pain in the epigastric region, led at first to the opinion that the salivation might be due to some form of abdominal disease, and as disease of the pancreas has been supposed—mainly, as it seems, on theoretical grounds—to give rise to salivation, very careful and repeated examinations of the abdomen were made in order to detect any tumour in this situation, but nothing of the kind could be discovered. The motions were also repeatedly examined, but nothing unusual was detected in them. The child had not been getting medicines of any kind before admission, indeed she did not seem to have required any. Baffled in every direction, the unsatisfactory diagnosis of "idiopathic salivation" had to be made. The girl was six years old; she had twenty teeth; her previous illnesses had included measles and whooping-cough some time ago, and when two years old she had had an obscure illness characterised by crossness and disturbed sleep, ascribed to worms, although none were seen. Since then she had been strong and healthy: she was bright and intelligent, and had been at school since the end of last summer. At times of late she had pains in the belly, and even occasionally slight sickness and diarrhœa, but the mother ascribed these attacks to some error in diet: the pain in the belly was sometimes severe enough to make her cry, and its duration was roughly estimated as being about half an hour. The family history seemed very good, only one having died out of seven brothers and sisters, from some affection of the bowels. From the beginning of February it was noticed that much water came from her mouth, so that on returning from school her clothes in front were all wet, so much so, indeed, that she had soon to be taken from the school on that account; it appeared as if the salivation had gradually been getting worse. On admission on 25th February, she was found to be spitting every few minutes, bringing out about a teaspoonful of saliva at a time, and on giving her a dish this discharge was found to measure about 30 oz. in the 24 hours; but in addition to this, all her clothes were found quite wet in the morning when she was dressed. The exact measurement varied from 28 to 34 oz. The fluid brought up seemed to be thin saliva, but quite tenacious, its specific gravity was 1003. No redness existed in the gums or cheeks, there were no unhealthy patches visible anywhere, and there was no swelling or tenderness of the glands in the neck or cheeks, and there was no affection of the ears. The fluid seemed to come chiefly from the sublingual glands. On admission she was, after a day or two, put under treatment with belladonna, beginning with $\frac{1}{4}$ grain of the extract three times in the day, gradually increased to $\frac{3}{4}$ grain as often. The ordinary diet was ordered. After about a fortnight's residence a diminution in the quantity of saliva was noticed, and this gradually became more and more pronounced, both as judged by the quantity in her spittoon and by the wetness of her clothes in the morning. By the middle of March the profuse salivation had nearly ceased, and she was dismissed well on 24th March. Seen a week later there had been no return of the affection. The child's appearance was also improved, although she could not be said to look ill even at the height of the salivation. During her stay she had only one or two slight attacks of pain in the abdomen at the beginning, and only once a little vomiting, due, it was supposed, to eating some sweetmeats. The temperature in the axilla was normal. The improvement in this case coincided so clearly in point of time with the carrying out of the belladonna treatment, that I was distinctly inclined to accord this remedy the credit of the cure.

There is a short account of idiopathic salivation in children in Gerhardt's *Handbuch der Kinderkrankheiten*, Bd. IV. Abth. ii. s. 13. (*Glasgow Med. Journ.* August, 1882.)

Occult Cases of Pyæmia.—Dr. P. K. Pel gives an analysis of certain cases of obscure febrile disease, in which a source of pyæmic infection was only discovered on post-mortem examination. In commenting on the importance in diagnosis of remembering such a possibility, he remarks as follows: A previously healthy person is attacked with a quotidian pseudo-intermittent fever, associated with swollen spleen and disturbed digestion. No local cause of the fever (such as empyema, tuberculosis, &c.) can be made out by physical examination. The usual febrifuge medicines, given in sufficient quantity and in good time, have no abiding effect. In such a case the diagnosis will lie between—(1) occult or cryptogenic pyæmia; this is most likely when the feverish attacks are very severe; it is not excluded by the appearance of labial herpes: (2) ulcerative endocarditis; the physical signs will serve to confirm this: (3) irregular typhoid: (4) syphilis, even though for the time no other signs can be discovered. (*Zeitsch. f. klin. Med.* IV. 1882.)

The Treatment of Epilepsy by Ligature of the Vertebral Arteries.—Dr. Alexander, of Liverpool, gives an account of the treatment of twenty-one inveterate cases of epilepsy, by ligature of the vertebrals. Three of the cases have been free from fits for a year. In nine others the freedom from fits has lasted so long that a cure may be said to have resulted, and eight have "improved in so many respects, or are improving so steadily, that the operation would be justifiable were no better results ever obtained." Dr. Alexander thinks the treatment is likely to become general for that class of cases of epilepsy that are uninfluenced by drugs or removal of all recognised peripheral causes. He finds the artery by making an incision of three inches in length along the external border of the sterno-mastoid, commencing about an inch above the clavicle, and at the lower end and outer side of the external jugular vein. The layers of fascia are cut through until the fatty tissue over the scalenus anticus is reached. The sulcus between this muscle and the longus colli being reached, the sixth cervical vertebra is easily made out. The artery will then be easily found, provided no veins are met with. There is little or no hæmorrhage if the operation is performed carefully. To afford a reasonable hope of success, the operation should not be put off too long, but should be performed so soon as it is evident that no hope of cure arises from the judicious use of medicines. Even in cases of epilepsy of very long standing, Dr. Alexander has found the operation beneficial, and he is inclined to think that many of even the most inveterate of them can be cured. He considers that the operation acts by diminishing in a marked degree the hyper-sensitiveness of the medulla, and before the collateral circulation is re-established the sensibility of the epileptic centres is so benumbed that they do not respond so readily as before. The dangers of the operation are insignificant. There was only one death in over thirty operations. The cause of death in this case was septic pleurisy, due to the tearing off of the antiseptic bandages by the patient, who was an idiotic girl. (*Brain*, July, 1882.)

The Treatment of Enlargement of the Spleen.—Injection of drugs into the substance of the spleen has been lately tried as a means of obtaining a reduction of the bulk of the organ in cases of hypertrophy. Hammond obtained a rapid reduction in size by the injection of ergot. Kussmaul, of Strasburg, endeavoured to lessen the size of the organ by simple puncture with a large needle, hoping thus to produce a hæmorrhagic infarct which might cause some atrophic shrinking, and by repetitions of the process a considerable reduction in size of the organ. The result, however, disappointed his expectation, for no marked effect was produced by fourteen punctures. Galvano-puncture was tried four times, with no better result. A parenchymatous injection of ·1 gramme of sclerotic acid was made, and death followed in six hours. At the autopsy, no trace of hæmorrhagic infarct could be found in the organ; only around one of the punctures was there a reddish zone. The patient was suffering from leucocythæmia, and whether death was caused by the sclerotic acid or not, the lesson is certainly taught that injections should be made into the substance of the spleen in that disease with extreme caution. Mosler, of Greifswald, has tried injections in other forms of enlargement with success, but prefers Fowler's solution to ergot, and has found those cases most suitable in which the spleen is hard. He thinks it well, also, to apply ice to the splenic region for some hours before an injection is given. A remarkably good result has been reported by a St. Louis physician, Dr. Emanuel, of the internal use of ergot. The patient was a gentleman forty-three years of age, whose spleen was so much enlarged as to fill almost the whole of the abdominal cavity. It was firm and tender, and the patient affirmed that the swelling had existed for two weeks only. There was no history of malarial disease. Thirty drops of Squibb's extract of ergot were given three times a day, and the dose gradually increased to sixty drops. In three days the spleen had lost much of its hardness, although its size remained nearly the same. A week later, however, it was distinctly smaller; every day the diminution went on, and in a few days more the spleen was reduced to nearly the normal size. (*Lancet*, Sept. 30, 1882.)

The Treatment of Intussusception.—Dr. W. R. Gillette, physician to the Bellevue Hospital, relates a case of intussusception in a child nine months old, relieved by injections of water, the administration of chloroform by inhalation, and manipulation of the tumour felt through the abdominal wall.

This, he states, is the third case of intussusception in infants which he has seen, and which he has been able to reduce by these means. He thinks that these cases are best managed in the way indicated. In two other instances, in which he advised this treatment, reduction was utterly impossible under the other methods tried. The children in each of these cases were held while struggling, and the injections forced into them against all voluntary and involuntary efforts which they could make. He deems the administration of chloroform almost absolutely necessary. The reason is not difficult to find, inasmuch as, while it gives perfect control of the patient, it also eliminates the element of muscular spasm. Moreover, massage is a powerful adjuvant to the hydrostatic pressure of water in these cases. In the first two cases the obstruction was not overcome until massage also was employed. (*New York Med. Journ. and Obstet. Review*, Sept. 1882.)

The Treatment of Traumatic Tetanus.—Prof. Humphry, of Cambridge, in a discussion at the Cambridge Medical Society, said that he had seen a great many cases of traumatic tetanus, and had arrived at certain conclusions respecting it. First, that it is a passing malady depending, probably, like smallpox, scarlet fever, and others, upon some blood-poisoning; like them, it is amenable to no known curative treatment, but runs a certain course and subsides, provided it does not kill the patient in the meantime; that, like them, it is fatal in proportion to the acuteness and severity of its onset. Of the rapidly progressing cases very few survive, whereas in those which come on more tardily, and more particularly in those in which the patient continues to be able to take food, a favourable result may by good management not unfrequently be obtained. Secondly, that the disease is attended with much wasting and exhaustion, sometimes with high temperature, and that the most important feature in treatment is to give nourishment, which must generally be in a fluid form—milk, eggs, beef-tea, wine, &c.—as much as the patient can take. While food can be swallowed there is hope. It must be urged upon the patient, who is often reluctant to take it; and no other treatment should be allowed to interfere with this. Sedatives, such as morphia hypodermically injected, tobacco, and others, come in as adjuncts in the more severe cases; but are better abstained from unless the case is severe. Reliance should be placed solely on the feeding, with attention to the bowels; it is commonly necessary to give aperients. The worst case Prof. Humphry had known to recover was that of an infant in whom the removal of a considerable tumour from the back of the neck was followed by tetanus. The spasms were so frequent and so severe, that on several occasions the child was thought to be dead; and in this case, as in others he had observed, the seizures were most severe after a very prolonged interval, as after sleep. Still the child swallowed milk. The milk was sedulously given, no other treatment being allowed, except subjecting the child to the fumes of tobacco smoked by persons near it, which was thought to do some good. In other cases he had found tobacco, smoked or administered in a mild form, to have a soothing effect. He had kept patients persistently under the influence of chloroform without any benefit. The maintenance of strength by nourishment, so as to enable the patient to tide over the attack, is the great thing to be aimed at.

Treatment by Large Doses.—Dr. Seguin considers that the dose of many remedies ordinarily prescribed in certain nervous diseases—such, for example, as chorea, cerebral and spinal syphilis, and neuralgia—is too small. In advocating large doses, he does so as the result of an extensive practical experience, and not on mere theoretical grounds. At the same time he takes all reasonable precautions, and says:—"I am carefully observant of all the circumstances which render patients susceptible, and always make an allowance for idiosyncrasy. Thus, in first prescribing a potent remedy, I take into consideration the age, sex, and size of the patient, and also make an estimate of his general condition, and note particularly the state of his circulatory organs. Then, for a patient whom I see for the first time, I order very small doses, doses such as the books justify, and, by steady increase, feel my way, fearlessly because watchfully, to the larger doses, often seemingly dangerous doses, which really affect the organism, and may cure the disease." Dr. Seguin gives Fowler's solution in doses of from three to thirty minims three times a day. In the case of children or sensitive adults, he may commence with a dose of only two drops, but usually begins with five, every day adding one drop to each dose. He does not attach any very great importance to giving it after meals, but is careful to give it largely diluted with water—half a tumblerful or more. Usually, when a dose of from ten to fourteen drops three times a day is reached, some arsenical symptoms appear, such as diarrhœa, nausea, vomiting, anorexia, or redness and puffiness about the eyes. When these symptoms are noticed, the administration of the arsenic should be suspended for forty-eight hours, and should then be resumed, the dose being still further increased. A remarkable tolerance is shown by most patients—even young children; and doses of twenty, twenty-five, and even thirty drops, three times a day, may be reached without a renewal of the symptoms. In one case, thirty-four drops of Fowler's solution were taken three times a day without the production of any unpleasant symptom. The author has been taught by experience not to expect amelioration of choreic movements until the toxic effects of arsenic are evident, and, in old or relapsing cases, not until the second period of toxicity. He finds it advisable to combine rest, even absolute rest in bed, with the arsenical treatment. If the patient be restless at night, an occasional dose of chloral will do good. Simple acute chorea may be cured by this plan in a fortnight, and it is rare to meet with any case of chorea that resists this mode of treatment. There is no possibility of any permanent ill effect resulting. The urine of many patients has been carefully examined at the period of saturation with arsenic, but albumen has never been detected. Stomatitis was met with only once, and gastro-intestinal disturbance was never serious or permanent. (*Trans. Med. Soc. New York*, 1882, and *Lond. Med. Rec.*, Oct. 15.) [*Practitioner*, xxvi. 286.]

Paget's Disease of the Nipple.—Prof. M'Call Anderson is of opinion that while in exceptional cases a simple eczema of the breast may be the exciting cause of, and be followed by, cancer, Paget's disease of the nipple is from the outset of a malignant nature. He compares it to the 'psoriasis' of the tongue which often precedes epithelioma. He gives the following table as an aid in differential diagnosis :

Paget's Disease of the Nipple.	*Eczema of the Nipple and Areola.*
1. Occurs especially in women who have passed the grand climacteric.	1. Occurs especially in women earlier in life, and particularly during lactation, or in persons labouring under scabies.
2. Affected surface, in typical cases, of brilliant red colour, raw and granular after removal of crusts.	2. Surface not so red and raw-looking, and not granular, but often punctated.
3. When grasped between the thumb and fore-finger, superficial induration often felt, as if a penny were laid on a soft elastic surface and grasped through a piece of cloth. (*Thin.*)	3. Soft, and no induration.
4. Edge of eruption abrupt and sharply cut, and often elevated.	4. Edge not so abrupt, and not elevated.
5. Very obstinate, and only yields to extirpation or other treatment applicable to epithelioma generally.	5. Although sometimes obstinate, yields to treatment applicable to eczema.

(*Glasgow Med. Journ.* Oct. 1882.)

Hypodermic Injection of Mercurialised Peptone.—M. Martineau has now treated six hundred syphilitic patients by subcutaneous injections of ammonio-mercuric peptone. He has performed 11,000 injections in all; he has never had any mishaps, neither phlegmon nor abscess, even in a patient suffering from diabetes mellitus. He has hardly ever seen any signs of stomatitis or salivation, nor any of the phenomena of mercurial cachexia or gastro-intestinal disturbance. (*Brit. Med. Journal*, Aug. 26, 1882.) [*Practitioner*, xxvii. 358.]

Treatment of Pulmonary Diseases by Ignipuncture.—Dr. Vidal writes advocating numerous light cauterisations in the treatment of diseases of the respiratory organs. He employs a Paquelin cautery with a very fine point kept just at white heat. The point is held in the hand like a pen, and the operator, by a rapid movement of the wrist, makes a number of exceedingly fine lines about fifteen millimetres apart, just grazing the epidermis, but never going deep enough to destroy any of the deeper cutaneous tissues. The efficacy of the procedure depends rather upon the multiplicity of the cauterisations than upon their depth or superficial area. A sitting should be held once in two or three days, care being taken in the repeated operations to avoid the points on the skin previously touched by the cautery. The pain caused by the operation is very trifling, and no disfiguring cicatrices are ever left. The effects produced by this punctate cauterisation are of three kinds. The first is in the action on the skin. There is always an intense hyperæmia of the skin following the operation, together with an elevation of local temperature, amounting in some cases to more than 1° C. The impression produced upon the nervous centres is shown by the horripilation of the skin, which is pretty constantly observed over the cauterised area. The effects produced upon the lungs and pleura are observed in a reduction of the number of pleural friction-sounds, together with the gradual subsidence of all the evidences of pulmonary congestion. The dulness diminishes, the lung becomes more permeable to air, and in some instances Dr. Vidal even claims to have succeeded in arresting hæmorrhages of some gravity. At the same time there is an evident improvement in the cough and expectoration. The effects upon the general system are equally noticeable. The fever diminishes, the evening exacerbations lose their regularity, sometimes even disappearing entirely ; the sleep becomes refreshing, and it is seldom necessary to continue the use of atropia to control the night-sweats ; the appetite improves, the diarrhœa is checked, and in women the suspended menstrual functions are restored. The author gives the results in forty-four cases of phthisis treated by him on this plan during the winter of 1881-82. Two of his patients discontinued the treatment, three died, two remained stationary, and in one case the disease steadily progressed ; the remaining thirty-six were benefited, some markedly so. Eighteen of his patients had previously had hæmoptysis ; in ten of these there was no return during the winter, and in the other eight each recurrence of hæmorrhage was promptly checked by the employment of the punctate cauterisation for a short sitting. (*L' Union Médicale*, July 20, 1882.)

Extracts from British and Foreign Journals.

M. Pasteur's Inoculations in Prussia.—The commission nominated some months since by the Prussian Government to verify the experiments of M. Pasteur on the immunity from *charbon* conferred on animals by inoculation with attenuated virus, has just published its proceedings. It appears that M. Pasteur has issued victoriously from this new investigation. Two series of experiments were undertaken in two different localities near Berlin. M. Thuillier, M. Pasteur's well-known assistant, performed two series of inoculations, at an interval of fifteen days—April 5 and April 19. On May 6, all, whether they had been inoculated before or not, were inoculated with the virus of *charbon*. Of twenty-five "unprotected" sheep, twenty-four succumbed in a very short time, as did three of the "unprotected" cattle, three others surviving after having presented manifest signs of disease. On the other hand, all the animals that had been "protected" bore the inoculation without any disturbance. Of the twenty-five "protected" sheep, three, aged less than a year, succumbed to the consequences of the inoculations. The results obtained from the second series of experiments were just as conclusive. A question of the highest interest awaits determination, namely, the duration of the immunity conferred by these preventive inoculations. We shall not have to wait long for some information on this point, for more than a year has elapsed since the performance of M. Pasteur's first inoculations in France. (*Gaz. Médicale*, July 29, 1882.) [See *Pract.* xxviii. 152.]

It should be noted that Dr. Klein has recently experimented with some specimens of "*vaccin charbonneux*," purporting to be prepared under M. Pasteur's direction, and to be efficacious as a prophylactic. He found these specimens to be highly virulent, and fatal to sheep, guinea-pigs, and mice. He therefore regards the introduction and use of this so-called "*vaccin*" in England to be highly dangerous. (*Veterinarian*, Sept. 1882.)

Disinfectants.—Prof. Koch has tested the ordinary disinfectants in three ways. 1. To ascertain whether a particular disinfectant is capable of destroying the resting-spores of bacilli which are the most difficult of all forms of life to destroy. No disinfectant can be safely trusted which cannot destroy the developing power of the resting-spores. The resting-spores of splenic fever were generally employed for experiment. 2. To ascertain how the disinfectant behaves in regard to more easily destructible fungi, such as yeast, bacteria, bacilli, and micrococci. 3. To ascertain whether the disinfectant is capable of arresting the development of micro-organisms in suitable nutritive liquids.

Carbolic Acid did not prove itself to be a sovereign disinfectant. A 5 per cent. solution only sufficed after two days to arrest the developing power of splenic fever spores; while a 1 per cent. solution destroyed in two minutes the bacilli themselves. A solution of 1 in 850 sufficed to check the development of the latter. Soaking five to seven times repeated, in a 5 per cent. solution of acid, was only sufficient to retard the development of the resting-spores. The fact is very noticeable that carbolic acid in oil, or in alcoholic solution, is absolutely without effect on the bacilli and spores. The latter, after remaining 110 days and 70 days respectively in a 5 per cent. solution of carbolic acid in oil and in alcohol, were repeatedly found intact. The same was the case with *Salicylic Acid* and *Thymol.* In the form of vapour, better results were obtained with carbolic acid, but only at higher temperatures. Even the action of carbolic acid vapour at 75° C. for two hours, failed to destroy the resting-spores completely. Chemical combinations of carbolic acid with other bodies, or cheap crude products containing carbolic acid, were less effacious than the pure preparation. A 5 per cent. solution of zinc sulpho-carbolate destroyed the resting-spores in five days; a 5 per cent. solution of sodium phenate (carbolate) in ten days merely reduced their power of development, while sodium sulpho-carbolate failed to do this within the same period of time. Crude wood-spirit, and pyroligneous acid in a concentrated state, destroyed the resting-spores in twenty days and two days respectively; while wood-tar and coal-tar, in a moderately concentrated condition, had no effect.

Sulphurous Acid. Even under such favourable conditions as are not attainable in ordinary practice, sulphurous acid fails to destroy the whole of the minute living organisms that may be present. The experimenter says this is a very uncertain disinfectant, as is also calcium bisulphite.

Zinc Chloride. In spite of the prevalent opinion that a solution of 1 in 1000 of this agent is a safe disinfectant, it was found that even a 5 per cent. solution failed within a month to weaken the developing power of the splenic fever spores. After testing various other substances, Koch concludes that the only certain disinfectants are chlorine, bromine, and corrosive sublimate; and that to arrest development, only corrosive sublimate, certain ethereal oils, thymol, and allyl-alcohol are to be trusted. Bromine vapours are recommended for confined spaces. Chlorine is a little less satisfactory, but more so than was formerly supposed. In all places where neither gases nor heat are available, corrosive sublimate, and indeed all the mercurial salts are recommended. A solution of 1 per 1000 of the mercuric chloride, sulphate, or nitrate killed the resting-spores in ten minutes; and, indeed, simple moistening of the earth containing the spores with this solution is sufficient to arrest their power of development. Solutions of 1 in 1000, to 1 in 15000, are sufficient to kill micro-organisms. The poisonous action of such diluted solutions may be disregarded. The cost also is far below that of carbolic acid. (*Mittheil. der kais. Gesundh.* 1881, Band x.; *Rep. der Analyt. Chemie.* 1882, No. 1.)

M. de la Croix has also made a series of experiments to ascertain the relative value of various substances in preventing the development or evolution of the micro-organisms of putrefaction. [These do not necessarily possess the same properties with regard to disinfectants as the pathogenous bacteria; but the comparison is interesting.] He placed finely-divided boiled or raw meat in water, and ascertained the maximum and minimum quantities of each substance that were effective. The figures in the following table indicate the number of grammes of water in which one gramme of the substance mentioned prevented the development of micro-organisms; *a* denotes the maximum dose by which development is not arrested; *b*, the minimum dose by which development is arrested.

Substance employed.	*a.*	*b.*
Alcohol	30	1·77
Chloroform	134	1
Sod. biborate	107	14
Eucalyptol	308	14
Phenol	1002	10
Thymol	2229	20
Potass. permanganate	3041	35
Picric acid	3041	100
Borated sod. salicylate	3377	30
Benzoic acid	4020	50
Ethereal oil of mustard	5734	40
Sulphurous acid	7534	72
Alum. acetate	7535	478
Salicylic acid	7677	343
Mercury bichloride	8358	2525
Calc. hypochlorite	13092	109
Sulphuric acid	16782	135
Iodine	20020	410
Bromine	20875	493
Chlorine	34509	431

This indicates that chlorine, the hypochlorites, and perchloride of mercury are very effective, while alcohol is comparatively impotent. (*Revue Scient.* Feb. 1882; *Brit. Med. Journ.*)

The Hot Foot-Bath.—Dr. Scholkowsky has been experimenting with Basch's sphygmomanometer upon healthy persons in various circumstances. He finds that when the feet are plunged in hot water of 95° F. the blood-pressure at once rises through from two to seventeen mm. of mercury. The rise persists for ten to fifteen minutes after the bath. (*Centralb. f. med. Wissensch.* Sept. 9, 1882.

The Action of Morphia on the Intestine.—Prof. Nothnagel has been experimenting with a view to determine by what means morphia produces its constipative action on the bowels. He had already discovered that, if a sodium salt be applied to the surface of a rabbit's intestine, an ascending constriction ensues: this is doubtless due to a nerve-action. He investigated the effect of morphia on this intestinal movement, in etherised rabbits whose abdomen was opened in a bath of salt solution. When small doses of the hydrochlorate (0·1 to 0·3 gramme) were injected subcutaneously the ascending constriction did not follow when the bowel was touched with a salt crystal: a mere local contraction resulted. After larger doses (0·05 gramme) the ascending constriction again appeared, and now more actively than at first. The localization of the sodium salt stimulus under small doses is therefore not due to any paresis of motor nerves, but to stimulation of fibres inhibiting the peristalsis. Larger doses paralyse these inhibitory fibres. A coil of intestine, doubly ligatured and separated from the mesentery and its nerves, gave a lively peristaltic response to the salt-stimulus, although before the operation its response was purely local, and though in all the rest of the intestine the response remained local. From this it appears that the inhibitory action of the morphia is chiefly exerted through the splanchnics.

Thus the constipative action of morphia is due to the fact that it stimulates the inhibitory nerves of the intestine. Morphia acts on these, as digitalis on the vagus. Both stimulate the inhibitory mechanism in small doses, and paralyse it in larger doses. (*Virchow's Archiv.* 1, vol. 89.)

The Hypnotic Value of Tannate of Cannabin.—Dr. Fronmüller, of Fürth, has been investigating the properties of a preparation of Indian hemp, the tannate of cannabin, which he obtained from Merck of Darmstadt. The tannate of cannabin is a yellowish brown powder, insoluble in water or ether, slightly soluble in alcohol, and easily dissolved in water made slightly alkaline. It has a taste like tannin, and a not unpleasant smell. In the distillation of Indian hemp, two volatile oils are developed, cannabin oil and its hydrate. These are rapidly-acting irritant poisons. They are said to be removed in the preparation of the tannate. Dr. Fronmüller states that he has used Indian hemp itself for thirty years, and that there has been a steady increase in the strength of the preparations furnished him. Thus, thirty years ago, he began with a dose of eight grains, ten years later he had to reduce it to four, and latterly to two grains. The dose of the present preparatión, the tannate, ranges between gr. ii. and gr. x., the most frequent dose being gr. v. The drug was used fifty-seven times in hospital and six times in private practice. The patients consisted of twenty-one men and forty-two women, for the most part between twenty and forty years. Forty of them were suffering from phthisis, the remainder had different diseases, generally of a chronic nature. The common symptom in all cases was insomnia, and it was for its hypnotic effect that the cannabin was given. Good results were obtained in thirty-seven cases out of the sixty-three, and moderately good results in fifteen cases. It was called a good result when quiet and uninterrupted sleep came on within an hour after taking the medicine, the patient awakening with no toxic after-effects. In twelve cases no result was produced. Many of the patients had been taking opium. From the sixty-three trials thus reported, Dr. Fronmüller concludes that *cannabin tannicum* is a very useful hypnotic, powerful without being dangerous, and one which does not disturb the secretions or leave unpleasant toxic after-effects, if given in proper dose. (*Memorabilien*, July 21, 1882.)

How to Count a Rapid Pulse.—Dr. Abbot describes a method which he adopted for counting the heart's action during some experiments he performed with alcohol on birds. He found that he was unable to count by the usual mode when the contractions exceeded 240 per minute, whereas, by the method he now describes, he easily counted 280. "During a definite part of a minute, usually one-fourth, with a lead pencil dots were made upon a sheet of paper, synchronous with the heart-beats, as heard over the cardiac region. The dots were then counted. A pulse of four hundred could be taken in this way, provided each pulsation were distinct enough to be discriminated by the touch. The indistinctness of the separate pulsations alone fixes the limits to the use of this method, as the human hand is capable of marking intelligently and with accuracy at the rate of 450 dots per minute, for thirty seconds, which rate is probably beyond not only that possible to the human heart, but also that of the pulse of any of the lower animals available for experiment. I have had a sufficient experience with this method to know that it is of practical value, especially with children. . . . All movements, whether of the body or not, that can be seen, felt, or heard, can be thus counted up to 400 or 500 per minute, provided that they are sufficiently distinct to be discriminated." (*New York Med. Record*, Aug. 12, 1882.)

The Subcutaneous Administration of Cathartics.—Dr. A. Hiller has made a number of experiments with a long series of cathartics, and concludes that the hypodermic method offers no advantage over the internal administration of cathartics, either in the dose required, the time required, or in the avoidance of disagreeable symptoms. (*Centralb. f. med. Wissen.*, Aug. 19, 1882.)

Treatment of Lead Colic by Belladonna.—M. Bernutz has been repeating the researches of M. Malherbe as to the tolerance of belladonna in cases of lead colic. He finds that as much as sixty centigrammes of the powder may be administered in severe cases. When thus used in association with purgatives, a prompt cure usually resulted. (*Rev. de Thérap.*, Aug. 1882.)

Treatment of Infantile Earache.—At the American Medical Association Dr. Jacobi recently remarked that closing the mouth of infants and children, and simply blowing into the nose, is often a very valuable method of relieving severe earache. The cause of the trouble in these cases is probably a catarrhal affection of the Eustachian tube. (*Medical Press,* Aug. 9, 1882.)

Congenital Malaria—From a careful study of this subject Dr. Ch. Leroux derives the following conclusions: (1) It is as yet impossible to affirm the existence of a congenital form of malaria, or to establish the influence of heredity in infantile malaria. The reported cases are not numerous enough or sufficiently conclusive. (2) The existence of certain cases of congenital hypertrophy of the spleen in children born of malarial parents, in which the hypertrophy can be attributed to no other cause, together with the existence in such cases of other signs of malarial cachexia, render the existence of a congenital or hereditary form of malaria not altogether improbable. (3) Certain children appear to be born with an inherited predisposition to malaria, and may, even without being directly exposed to external malarial influences, suffer from the time of their birth from an intermittent form of fever of a type similar to that existing in the mother. Considerable reserve is expressed as to the part played by heredity in the production of these cases. Further researches are necessary. (*Rev. de Méd.* July, 1882.)

Anatomy and Physiology of the Heart-muscle.—A concise and useful review of the microscopic anatomy and of the physiology of the heart-muscle is given in a lecture by M. Pitres. He concludes the histological part with these remarks: " By the constitution and the mode of grouping of its elementary fibres, by its double striation, longitudinal and transverse, by its chemical composition, and by its embryonic evolution, the myocardium resembles the voluntary muscles; by the absence of sarcolemma, by the general arrangement of its connective tissue, by its mode of insertion into the fibrous tissue, it approaches the unstriped muscles. Lastly, it differs from all the other muscles of the body by its reticular structure, by its division into cellular segments, and by its nerve endings. In fact, the cardiac muscle is the only one of its kind, and it deserves special description in the general history of muscular tissue." The physiological part is summed up in this way :—"From the point of view of general physiology, the cardiac muscle constitutes a well-marked variety of muscular tissue. Although its action is apparently very different from that of the other muscles, it possesses in reality the same essential properties. It lives, breathes, is nourished, develops heat, and undergoes electrical variations, just like the striped voluntary muscles. Its contraction is slower than that of the voluntary muscles, and shorter than that of the unstriped muscles, but it presents the characters of a simple physiological action in all respects essentially similar to the elementary contraction of other muscles. The relative want of dependence of the heart upon the nervous system is only apparent. If it continues to beat even after being removed from the chest, this is simply due to the fact that it contains in its substance collections of ganglionic cells, which are the exciting agents of its automatism. Separated from the intracardiac ganglia, the myocardium behaves like other muscles separated from their motor nerves: it remains irritable, but it only contracts when excited by some external irritation. These same ganglia, in which the cause of the automatism of the heart resides, play also the part of trophic centres for the myocardium, and it is due to their influence that the cardiac muscle-cell escapes atrophy after section of the pneumogastric. The property of rhythmical contraction is perhaps the most important and special characteristic of the action of the heart-muscle. Still simple rhythm is not absolutely peculiar to the heart-muscle. It is more developed, more easy to demonstrate than in the other muscles, but it exists in different degrees in every variety of muscular tissue, so that it ought to be considered as a general property of muscle, and not at all as a special property of the myocardium. In fine, the functional peculiarities which distinguish the cardiac muscle from the other muscles, are not the result of essential differences in its elementary properties, for all muscles have the same elementary properties. What constitutes the specific difference are the variations, plus or minus, in the external manifestation of those properties. And above all the variations in the anatomical arrangements which unite the muscular elements to the central or peripheral nerve cells." (*Revue de Médecine*, Aug. 1882.) According to Reichhorst the vagi are the trophic nerves of the heart, and the heart undergoes fatty degeneration when they are divided. [*Practitioner*, xxii. 48.]

The Treatment of Effusion into Joints.—Prof. Volkmann observes that in chronic effusion into the joints, he has several hundred times punctured and washed out the cavity with a solution of carbolic acid of from three to five per cent. without ever meeting with any accident or disturbance. As a general rule, from ten to fifteen syringes full, each capable of holding forty-five ccm., had to be employed, and the fluid allowed to run away, before it was discharged clear; the synovial fluid, which the added carbolic acid speedily renders turbid, was then known to be entirely removed, and the joint thoroughly washed. In order that the carbolic acid might exert its influence on every part of the surface of the capsule, the joint was then moderately filled by the injection of from one to three syringes full, and then submitted for a short time to movements of flexion and extension. A larger quantity of the solution than this was never left in the joint. No symptoms of carbolic intoxication were ever observed. After the washing-out was finished, the limb was always surrounded by a Lister dressing, and kept immovable for some time on a splint. When the effusion was not of too old a date, recovery has always followed a single puncture and washing-out; although, as a rule, firm bandaging is required for the prevention of relapse, for diminishing the thickening of the capsule, &c. In bad cases, with great distension of the capsule and ligaments, due to large and old effusions, the puncture and washing-out have to be repeated two, three, even four times, at intervals of several weeks, before the capsule contracts sufficiently. Iodine injections, which Prof. Volkmann formerly employed frequently, he has now discontinued. They have no advantage, and occasionally give rise to suppuration of the joint. In the worst cases with great distension and thickening of the capsule, villous growths, large fibrinous coagula, dropsy, loose bodies, or *gonitis fibrinosa* without fluid exudation, Prof. Volkmann always makes a double incision into the joint, and introduces two short drainage-tubes, which, after carefully washing out the joint, are left in as long as any secretions issue through them. He is unable to say how often he has performed this operation, by far the most frequently executed on the knee, but certainly more than a hundred times. Even in these cases only disturbances of a very slight nature were met with, although bad cases were often treated. The general conclusion, therefore, is that both puncturing and washing out the joint, and the double incision and drainage, with the aid of antiseptics, may be declared to be operations unattended with danger and followed by satisfactory results. How thoroughly Prof. Volkmann has been convinced of this may be inferred from the fact that for a series of years he allowed Prof. Rancke to attach a manometer to the trocar, in order to institute experiments on the intra-articular pressure in the living man. None of these experiments did the slightest harm to the persons on whom they were performed. (*Centralblatt f. Chirurgie*, Aug. 19, 1882.)

Indications for Venesection.—Dr. B. Fenwick gives the following suggestions for rational venesection: (1) In cases of valvular stenosis, if dyspnœa or pain or urgent symptoms be present, bleeding is generally useful; it appears to be better to bleed often if necessary, but to take only a small quantity each time, and this by means of leeches or the cupping glass direct from the cardiac region. (2) In cases of valvular incompetency, if urgent dyspnœa or cyanosis or stupor be present, it appears best to bleed freely from the arm to about sixteen or twenty ounces if necessary, and if possible once for all. (3) In cases of acute pericarditis and endocarditis the attack may possibly be cut short by freely cupping the cardiac region at once. (4) In cases of cardialgia, without any evident cause, leeching or cupping over the heart's area will probably give relief. (*Lancet*, Aug. 5, 1882.)

Milk-Powder in Gastric Affections.—Dr. Debove, in a communication to the Paris Hospital Medical Society (*Gaz. Hebdomadaire*, August 25), observes that the milk regimen, which is so indispensable in affections of the stomach, and especially simple ulcer, speedily becomes so disgusting to the patients that it has to be left off. This serious inconvenience, however, may be remedied by the employment of the œsophageal tube, now used for feeding phthisical patients. But by this only a litre of milk can be introduced at a time, so that it would require to be employed six times in order to introduce the six litres, which is the mean quantity required for the subjects of *ulcus rotundum*. To avoid this frequent introduction of the tube, Dr. Debove has had skimmed milk evaporated (cream being but slightly digestible), and the residue reduced to a fine powder. If this be dissolved in warm hot milk, two or three litres of milk may be injected in the same volume as a single litre. It is possible that this milk-powder, which furnishes excellent results in gastric affections, may also prove very useful in Bright's disease, cardiac affections, and all cases in which a milk regimen is employed. About a litre of pure milk is represented by 120 grammes of the powder.—Dr. Dujardin-Beaumetz observed that in feeding the subjects of phthisis with the tube he has obtained excellent results from a mixture of powder of meat, powder of blood, and powder of milk. As powder of blood is not very digestible, he only adds a small proportion of that as a ferruginous principle. (*Med. Times and Gaz.*, Sept. 23, 1882.)

The Action of the Digestive Ferments upon Drugs.—Therapeutists have paid little attention to the changes which drugs, administered by the mouth, undergo in the digestive organs before they are absorbed, except in the case of those inorganic substances which are given for their direct effect on the gastric mucous membrane. The practitioner gives other drugs, for the most part, without considering how far they may be altered before they leave the alimentary canal. He is guided by what is known of their subsequent action on the system and of their effect in disease, and he is no doubt thus guided, in the main, correctly. Nevertheless the subject is not an unimportant one, since the influence of the digestive ferments on drugs must or rather should, determine the time of their administration in relation to the process of digestion. At present careful attention is paid to this point in choosing the time at which to administer those therapeutic agents which are designed to have a direct action on the stomach, but, as regards others, it is not considered except in so far as it influences the rapidity of their absorption. No facts, indeed, have hitherto been available for the guidance of the practitioner on this important subject. It is only since the processes for artificial digestion have been perfected that it has become possible to ascertain such facts, and the subject is certainly worthy of attention and experiment.

These remarks are suggested by a series of experiments of this nature, although with a different object, which were described at the recent meeting of the Pharmaceutical Conference by Mr. George Brownen. This gentleman has endeavoured to ascertain to what extent the digestive ferments may be made available for the production of preparations of various drugs. The question necessarily involved that of the extent to which their active principles suffered in the process. The constituents of rhubarb were found to be extracted, with remarkable completeness, by treating an infusion first with an acid preparation of pepsin, and then, after neutralisation, with an alkaline solution of pancreatin. The former extracted 47 per cent. of the rhubarb, and the latter 13 per cent. more, leaving only a residue of cellulose and earthy salts. Infusion of calumba, prepared with boiling water, and passed through a similar process of digestion, gave somewhat similar results; only spongy cellulose, associated with a trace of beberia, was left. Cinchona and opium, on the other hand, behaved differently; the gummy and extractive matters were dissolved and retained in solution, but a considerable quantity of the alkaloids was left behind. About half the cinchona and two-thirds of the opium were dissolved. The cinchona tannin was destroyed in the process of digestion, and failed to precipitate gelatine. The arabin of gum-acacia remained apparently unaffected by the process, but a peptonising change was wrought upon some other constituent of the gum, possibly a nitrogenous impurity. The mucilages obtained from Irish and Iceland moss were also tested, since they hold an intermediate position between foods and medicines. The alkaline extract of the pancreas seemed to exert very little action on Irish moss, although the proteolytic ferment of the pancreas, extracted with acids, soon destroyed the viscidity of the mucilage, and divided the jelly into soluble and insoluble portions. Iceland moss behaved somewhat differently. A jelly of it became flocculent when acted on by the gastric ferment, and under the influence of pancreatic extract deposited yellowish white flakes, consisting of non-crystalline masses, possibly peptic acid.

Of more direct interest, however, is the action of the digestive ferments upon definite organic compounds. The acidulated extract of the gastric juice decomposed a watery solution of salicin very slowly and imperfectly, but the pancreatic ferment split up the salicin into saligenin and glucose. Jalapin remained intact after digestion with the pepsin solution, but pancreatic digestion withdrew from it a copper-reducing substance. Neither process had any influence upon santonin. A solution of tannin, treated with the acid pepsin solution, became turbid, but the turbidity disappeared after the addition of a little more hydrochloric acid, and prolonged digestion seemed to have no further influence. The pancreatic extract, however, quickly rendered tannic acid incapable of precipitating gelatine, as it had been found to do in the experiments with cinchona bark, apparently by converting it into gallic acid. The experiments of Mr. Brownen go no farther, but he has evidently opened a new field which will probably yield results of considerable practical value. (*Lancet*, Sept. 23, 1882.)

Convallaria Majalis.—M. Langlebert finds that this plant contains two glucosides, convallamarin and convallarin, an alkaloid majalin, and an acid named majalic acid. The active principles are convallamarin and majalin. The most powerful preparation of the drug is an aqueous extract made from three parts of flowers and stalks with one part of roots and leaves. M. Tanret advises that the glucoside convallamarin should be used in medicine instead of the fresh extract, which is very apt to vary in strength with the seasons. Plants collected in August yield two grammes of convallamarin per kilogramme. The glucoside is soluble in water and alcohol, it is insoluble in ether or chloroform. It is not crystallisable and does not reduce Fehling's solution. Majalin is apparently only to be found in the flowers. [The "convallarine" referred to in our September number (*Practitioner*, xxix. 226) is merely a general term for the extract.] (*Bulletin Gén. de Thérap.* Aug. 30, 1882.)

Skin Grafting.—Dr. C. Johnson summarises what is known on skin-grafting in the following statements:—1. It affords an admirable means of accelerating and facilitating cicatrisation. 2. The pellicle produced by its aid is less prone to contraction, and contracts less than an ordinary cicatrix. 3. The deeper layers of the epidermic elements are the chief factors of growth. 4. The growing cicatrix is formed at the expense of the embryonic cells of the granulating surface, stimulated into activity by the presence of the living cells of the graft. 5. The stimulus first showing energy in and about central islands of new growth, induces activity at the hitherto dormant margin of the ulcer. 6. Grafts may retain vitality, and be effective, long after separation from the body. 7. Small grafts of the size of a millet-seed, for example, are generally preferable to larger ones, although much larger grafts have had their successes and advocates. 8. Grafts should be obtained from the patient himself, if possible, but in all cases the danger of specific inoculation ought to be present in the mind of the surgeon who borrows grafts from one subject for application upon another, or who practises heteroplasty. 9. Grafts furnished by the aged are less disposed to adhere than those obtained from the young, and sometimes fail entirely. 10. Grafts obtained from one race of men may be successfully used on individuals of another race; and animal grafts may be transplanted upon human beings and provoke cicatrisation. 11. Foul surfaces, or those of persons in bad health, will refuse to accept good grafts; but with improvement or establishment of the health of the individual bearing an ulcer, and the appearance of healthy granulations, a favourable result of skin-grafting may be anticipated. Finally, the great benefits accruing from successful skin-grafting far outweigh its drawbacks, which are, the pain of the operation, and, unless amputated limbs be utilised, the consecutive pain in the parts yielding the grafts, whether these be autoplastic or heteroplastic. (*International Encyclop. of Surgery,* vol. i. p. 549.)

Notes and Queries.

Butlin on Sarcoma and Carcinoma.—Our attention has been directed to several points in our review of this work last month, on which we have done scant justice to the accomplished author. As our object has invariably been to give our readers, as far as in us lay, a just and fair account of the books we review, we gladly take an opportunity of making the necessary corrections. Our remarks dealt with the work almost entirely from the point of view of a pure pathologist, and therefore we regarded the work as imperfect, and wished for a more complete treatment of pathological questions. From the point of view of a general practitioner, however, who does not care so much about the exact mode of cell-growth as about the diagnosis and treatment of a tumour from which one of his patients is suffering; the work is an exceedingly useful one. Thus, at p. 73, we find the important subject of the diagnosis between chronic inflammations, simulating tumours, and tumours which present signs of inflammation, treated in a very clear manner and illustrated by a typical case. In our review last month we noted the author's general great accuracy of observation and precision of statement, at the same time that we accused him of looseness or carelessness in some points.

We find that even on these points our criticisms were not quite correct. We commented on the severe strictures passed by Mr. Butlin on the introduction of the word "osteoid," and observed that it had been introduced by Virchow. We now find that it was not Virchow who introduced it. Müller used it in 1838, and in 1843 (Müller's *Archiv.*, p. 396) applied it to tumours, a large part of which was composed of bone, the finer structure of which he affirmed to be the structure of all bones. "Osteoid," therefore, as used by Müller, did not refer to the "crude product of a defective bone-forming process." Unconsciously our own review afforded an example of the correctness of Mr. Butlin's chief objection to "osteoid" and similar terms, "that they are not used always in the same sense or to express the same condition."

Hammam R'Irha.—When giving an account of this new Winter Health Resort (*Practitioner*, vol. xxvi., p. 241) we promised to give a more detailed account of the new hotel when it should be ready.

The new buildings are laid out on a most extensive plan indeed, so as to include not only what is wanted for the comfort of invalids, but all the amusements of a complete watering-place.

It is proposed at present, however, not to finish the whole building, but only the one wing, and leaving the chapel, theatre, etc., to be completed afterwards. The one wing which is now finished, and which will be occupied about the 15th or 20th of November, will contain about eighty bedrooms, dining-room, several private rooms for breakfast and for persons who do not wish to dine at *table d'hôte*, and a large saloon covering an area of nearly 2,000 feet. The whole building will be heated with two calorifères in the vaults. The hotel, which is, indeed, a perfect palace, will be comfortably arranged for visitors, either invalids suffering from chest affections, or from rheumatism or gout, at the time already mentioned. The baths in the new building, however, will not be finished until the end of January, or the beginning of February. The baths have been arranged in the old establishment, and invalids will be conveyed backwards and forwards in carriages. A hall, where they may rest after the bath, has also been prepared in the old establishment. There will be thus little or no danger of catching cold. Rheumatic or gouty persons will indeed be quite as well off here, even under the present conditions, as at most watering-places; when the new baths are completely finished, they will be very much better off than they are anywhere else.

The pleasure which we ourselves enjoyed during our stay at Hammam R'Irha, and the benefit which our health derived from it, perhaps incline us to take a very favourable view of Hammam R'Irha; yet looking at it perfectly impartially, we see no reason for altering the opinion we have already expressed in the *Practitioner*, that there is at present no other watering-place to which patients suffering from gout and rheumatism can resort in winter. Helouân, near Cairo, may become such a resort in the future, but the accounts which we have received from visitors to it during last winter, show us that it is not at present quite suitable for invalids. Another advantage which Hammam R'Irha possesses is the constant residence of a doctor who speaks English perfectly, and is thoroughly well acquainted with English habits. We believe that Dr. Brandt of Royat, while continuing to reside there during the summer as heretofore, has determined to settle permanently in Hammam R'Irha during the winter. The prices at Hammam R'Irha are as follows:—room with window looking to the south, 5 francs; looking to the north, 4 francs; dejeuner 3 francs; tea and coffee, 1 franc; dinner, 4 francs; service, 50 cents. bougie 50 cents. These prices are for meals served in the *salle à manger*, when they are taken in chambers the terms are somewhat higher.

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⁂ Any of the foreign works may be procured on application to Messrs. DULAU, of Soho Square, W.C.; WILLIAMS and NORGATE, of Henrietta Street, Covent Garden, W.C.; or BAILLIÈRE, of King William Street, Charing Cross.

Department of Public Health.

SCHOOL ATTENDANCE IN ITS RELATIONS TO OUTBREAKS OF INFECTIOUS DISEASE.

BY DAVID PAGE, M.D., EDIN.,

Medical Officer of Health to the Combined Sanitary Districts of Westmoreland.

THE question of controlling school attendance in localities invaded by some infectious disorder is one which has pretty constantly to be dealt with by the medical officer of health. It is with him that the unmixed responsibility rests of determining as a part of the action comprehensively taken against the spread of infection, to what extent restriction must be placed upon the movements of school children, and his recommendations to this effect become matter of much real importance both to himself and the school authorities.

The breaking up of schools on occasions of such emergency is naturally a serious affair, for the prospective benefit expected to result from the step is, in the nature of things, more or less problematical. But so, too, is the keeping open of schools when there is a probability of their being the centres or starting points of infection.

School managers and medical authorities are apt to take opposing views of the dilemma; nor is this a matter of wonder, for the one certainty in any instance about the case is the harsh interruption of school work, and a loss to the children of very valuable time. To the one side the grounds for action of this sort may appear in the highest degree urgent, to the other as clearly insufficient and uncalled for. Indeed, as an effectual safeguard against collisions of this kind, and based, I presume, upon their frequency, some enthusiastic sanitary reformers have gone so far as to propose that the power of closing schools should be vested in the local sanitary authority. Such a transference of authority would, in my opinion, be highly undesirable. It is quite possible to conceive that on occasion the refusal to comply with the requisition of the sanitary authority cannot altogether be charged to the indifference of the school management. It is clearly not enough that the managers of schools should be expected to act on the bare recommendation of the authority to close their schools. Something more is required, and that is a statement of the grounds upon which the recommendation is based in such a way as to convince any intelligent person that at least a *primâ facie* case has been made out sufficient to warrant the action so advised. Without effort of this kind being made for the co-operation of both sides in perfect sympathy and comprehension, how utterly absurd it must be to hope for the response of school management at times—not by any means unusual in the history of epidemics—the most critical in school-work, as the eve of an approaching Government inspection, or the first week or two of re-opening after the holidays. Ill-considered interference at such a time becomes vexatious and intolerable in the extreme. It too often happens, and in correspondence with the inefficiency of local sanitary administration, that upon outbreak of infectious disorder the first impulse of the authority is to demand the closure of the schools as the one sole condition of safety for their district, although, for the rest, official activity may be summed up in the casual visits of an inspector of nuisances, and the handing in of packets of some disinfectant at infected houses. The question may indeed be asked, what extent of outbreak, or what number of infectious cases, can be held to constitute sufficient grounds for ordering the closing of schools? Few, however, if any, having opportunity of practical acquaintance with the subject of infection, would hazard a numerical answer. It is not a question of mere statistics or of round numbers, but one of intimacy with the influence of those agencies at work in the earliest moments of the outbreak; and the degree of exactitude with which preventive measures may hopefully be applied is in correlation with this intimacy as to the origin, manner of spread of the outbreak, progress of early and convalescent cases, and, among other factors of infection, the probabilities of implication of school attendance. In a large majority of instances there is a risk of undue prominence being given to school closing, to the subordination and practical neglect of those other measures which are more peculiarly the preventive weapons of efficient sanitary organisation.

In the first years of sanitary work following upon the Public Health Act, 1872, this view of the situation may have been to a large extent unavoidable. The medical officer of health had, in the outset, to train his inspector, to become himself familiar with his district, and to establish arrangements for acquiring ready information from the several localities within his area such as the means at disposal might allow.

In these early years it did very easily happen for an outbreak of infectious disorder to gain such a foothold that the propriety of school closing was no longer in question.

But the past ten years ought surely to have allowed time for the purpose of an orderly system of sanitary supervision, and should also be bearing some results in the shape of a more active public interest and familiarity with local health matters, while this rudimentary condition which I have just indicated ought to have no existence under any sanitary administration at all worthy of the name. It would be superfluous and beyond the scope of this paper to enter at any length of detail into the consideration of preventive measures of general applicability against infection, beyond emphasising those which are the essentials of effective action, and for which it becomes the duty of every local sanitary authority to make provision.

1. Means for the isolation of infectious cases in the way of a hospital or convalescent home.
2. Early information of the occurrence of cases of infectious disease.
3. Control of school attendance of children belonging to infected families.
4. Continuous supervision until the termination of infection of all convalescents from infectious sickness.
5. Disinfection and purification of infected houses and things.

Wherever those safeguards are absent or unskilfully used, nothing is more certain than that disease will spread, infection be kept alive, and conflicting social interests ensue, with a total loss to the community, admitting of as precise financial statement as the results of a bankruptcy or a conflagration.

Of all other interests, that of school attendance is most seriously affected by defaults of this kind, a fact which, to my mind is in itself a quite sufficiently fatal argument against the proposal I have alluded to, of placing the absolute control of school attendance in the hands of local sanitary authorities. I need not do more than suggest what would be the too certain result of this ill-invested privilege at the hands of an authority neglectful of any permanent improvement of its district, indifferent enough to its real welfare, but ready to seize upon every opportunity of epidemic recurrence to earn a sham reputation for zeal by a fussy activity and an ingenious evasion of responsibility. The only hopeful remedy for this state of things, too common at present, will be in the education of communities in health matters to that point, at all events, at which self-interest, if no higher purpose, will insist upon local authorities acting up to their statutory functions.[1]

Having thus far dealt with the question of school attendance in its general relations to sanitary administrative work, I propose next to consider it in a more immediately practical point of view. In accordance with this intention I shall therefore confine myself for the rest of this article to certain results of my own observation and experience. From this aspect, then, scarlet fever, diphtheria, and measles, are the epidemic disorders with which the medical officer of health has chiefly to concern himself. These are essentially disorders of childhood, and it is, therefore, not a matter for wonder that school attendance should present, in a peculiarly intensified degree, the most favourable opportunities for their spread.

School attendance forms a large proportion of the lifetime of a child, and school becomes in no fanciful sense a sort of representative assembly of the susceptible population of the community. Added to this, the common atmosphere, more or less confined, of the school-room, the prolonged personal contact in school and out of school, that intimacy of intercourse which only childhood knows, aid in giving facilities for the dissemination of contagion which are quite unknown in any other phase of social life.

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[1] The reader is invited to peruse Dr. Buchanan's address on "Citizenship in Sanitary Work," delivered before the Society of Medical Officers of Health, October, 1876, which will be found in the *Practitioner*, vol. xviii. p. 384.

It is, therefore, not surprising that the large majority of local outbreaks of these disorders are more or less associated with school attendance. And this must inevitably follow a failure of promptitude in action against the earliest appearances of infection within a district. With certain exceptions, to be afterwards noticed, it ought not to be a matter of excessive difficulty, even in the absence of a compulsory system of notification, to obtain serviceable information of the invasion of a locality by infectious disorder.

The schoolmaster, and next, but of much less importance, the school attendance officer, are in the best position to give this information. Instances are within my own knowledge where schoolmasters of large schools of two hundred pupils and upwards, make a rule of instituting immediate inquiry in the case of every child absent even for a single attendance from school, and becoming informed of the cause—whether illness or neglect—of such absence. By a simple arrangement of the most obvious nature this information might, if needful, be at the service of the medical officer of health. Then there is the inspector of nuisances, who cannot very well fail, in the course of his visits—which ought to be frequent enough to every part of his district—and with his ears open, to learn by his own inquiry, or from the common talk of the neighbourhood, of the existence of cases of infectious disease.

In actual practice, and in the particular instance of town or large village districts, information so derived has given opportunity for the adoption of such effectual preventive measures that the absolute closing of a school is a recommendation to which I have happily never had to resort.

The isolation of the sick, to the best of the circumstances of the household, and the withdrawal of all the other children of the family from school, are the foremost of these precautions.

During the presence of infectious illness the locality should be kept under persistent surveillance, and I attach chief importance to the continuous supervision by the inspector of nuisances of all convalescent cases—by which I mean weekly visits to each infected house—whereby it is made certain so far as possible that precautions are not relaxed, especially in the instance of scarlatinal convalescents, who are always too apt to curtail the safe period of isolation.

And at the end, when risk of infection from the patient is past, the thorough and precise disinfection and cleansing of infected rooms, bedding, and clothing, must be carried out with such close attention to detail that it is made perfectly certain that nothing which has been about or upon the patient before and during illness and convalescence escapes purification.

In relation to scarlatina, the most plague-like, and by far the most difficult disorder with which the medical officer of health has to deal, I insist upon a period of isolation for the patient, and of absence from school in the case of the remaining children of *not less than eight weeks*, and longer if desquamation be delayed. During these eight weeks the supervision I have described is maintained. I view with every distrust the extraordinary statements of one or two zealous sanitary reformers, who have actually advocated some sort of treatment whereby the scarlatinal convalescent may be let loose among the healthy at the end of three weeks, or even a fortnight, from the beginning of illness. I should have thought that we had already experienced quite enough of the practical outcome of this sort of advice in the misadventures of insufficient convalescence common to every outbreak of scarlatina. The one great element of danger to schools, and against which every effort has to be directed, if a continuance of attendance during epidemics is to be made possible, is this particular mischief of the too early return of convalescent children.

It is this gross and hardly conceivable carelessness that facilitates its spread in every direction, in school and out of school, from town to seaside resorts, and throughout the country. But the weakest point of this doctrine of short convalescence, one furnishing, if need were, another fatal argument against it, is the summary manner in which the clinical aspects of the scarlatinal case are ignored. By this doctrine the human body might be a something capable of disinfection like any article of apparel, as no account whatsoever is taken of the state of the patient's system, no question raised about the lesions left behind by the very mildest attacks of the disorder, of damaged organs to be repaired, disturbed functions to be restored, and health renewed—for all of which a convalescence of eight weeks is not always enough.

My experience of scarlatina has certainly not been in one of what Mr. Netten Radcliffe once designated the *scarlet fever fields* of England, nor yet has it been, I am sorry to say, a limited one; and more than once I have seen death result from sudden kidney mischief, and even dropsy supervene so late as the sixth week, in the slightest, barely recognisable attacks of the disorder.[1] Some of the most annoying, and withal disheartening, instances of failure to stamp out infection in large families have occurred to my own knowledge where all went well for a month or six weeks—while in fact rigorous isolation of the patient was observed—until the convalescent child, after all possible disinfections, baths, and change of clothing, rejoined at this too early period its brothers and sisters, when forthwith the infection broke out afresh. But it is needless to multiply, for my present readers, illustrations of this order.

Turning now to those exceptional cases which I reserved for separate notice, wherein the closing of a school is a matter of necessity, these may be dealt with under two divisions: first, those in which the school itself has clearly become a centre or starting-point of infection; and secondly, schools existing under circumstances difficult of control. When facts implicate a school beyond doubt, or even with reasonable probability, as a channel of infection, closure, for the purpose of disinfection, is imperative. Quite recently two schools of this description came under my observation, and as one of these chanced to be a village school, while the other was a school in a town of some fourteen thousand inhabitants, each will very well serve for an example of the class.

In the case of the village school, scarlatina had broken out in four different families within the same week, and a crucial proof in evidence against the school as concerned in the outbreak was afforded by the occurrence of two other cases beyond the immediate neighbourhood, but both of children who had been in the habit of coming every day to this particular school. One of these cases occurred at a farmhouse upwards of a mile off, and the other in another direction altogether, at an isolated cottage quite two miles distant. Further inquiry placing beyond doubt the part played by the school in the transaction, led to the discovery of a couple of children who had meanwhile been attending school within a fortnight after an attack of what the parents believed to be "German measles," but which had, they admitted, been followed by desquamation.

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[1] These sudden fatal cases of scarlatina corresponded in their clinical phenomena with the description, given first I believe by Klebs, of glomerulo-nephritis.

The school was at once closed for the distinct purpose of disinfection and cleansing, and re-opened at the expiry of ten days, when these operations, including lime-washing, had been thoroughly carried out, under precautions against the return of convalescent cases or of children from infected households. The case of the town district school was very much the same, several cases of scarlatina occurring about the same period, and the clue to the school as a medium of infection being given by the instance of a child who, beginning school attendance for the first time, sickened on the second day of attendance, any other probable source of infection being apparently out of the question. Here, too, the school was closed for a week, during which the work of disinfection and purification was thoroughly done, and the re-opening, under similarly guarded conditions, was followed by no fresh outbreaks.

In a matter of such prime importance as school disinfection, it may not, I hope, be a too wide divergence from the subject to describe here in the fewest possible words what constitutes my own practice. The first step consists in the fumigation of the closed, and as far as practicable air-tight, room, by means of burning sulphur or brimstone, in the proportion of a pound weight, or rather more, to every 1,000 cubic feet of space, having, in the case of large or irregularly-shaped rooms, several points of fumigation.

Thereafter the walls are lime-washed, and then the whole of the woodwork, including desks, benches, cupboards, and the like, washed with soap and water, containing in solution two per cent. of carbolic acid (practically four ounces of carbolic acid to every gallon of water).

The disinfection and cleansing of school premises, which are too frequently found in a filthy state, are a most important matter, and ought to include such items of detail as the removal of all excremental matters, and the drenching with disinfectants of their foul receptacles, and all surrounding filth-polluted earth. The process of school disinfection is, in short, that which should be practised in a dwelling-house, without the difficulties involved in the effectual disinfection of infected articles of clothing and bedding. In the two cases I have cited above, the disinfection of the schools was done with the definite purpose of enabling school work to proceed without serious interruption, while the school itself was made a place of safety rather than otherwise for the children.

Under these particular circumstances, the view often held as to the less risk of scarlatinal infection which children run at school than in playing about the doors, is, I think, well founded. The conditions of security, however, must be loyally observed.

Passing to the second part of the subject—schools under conditions of difficult control—I would especially refer to those schools belonging to purely rural districts where the population is dispersed in scattered hamlets, detached homesteads, and remote farmhouses, even, as in the Lake district—to take an example from my own sphere of practice—in separate valleys lying widely apart, and whose inhabitants have but infrequent opportunities of intercourse. In these instances the country school forms the one sole centre of daily congregation for the children thus brought together from every corner of a large area with which the schoolmaster himself has naturally no intimate acquaintance. Outbreaks of scarlatina are then almost certain to gain ground, and assume wide prevalence, for the school presents not only the most favourable, but the only possible agency for rapid dissemination of the infection. The closing of such schools at the earliest moment that their implication is beyond reasonable doubt, is the most effectual preventive measure against the further spread of scarlatina. Delayed action will surely result in the utter disintegration of the school, since the outbreak is otherwise beyond control, and the fears of parents lead to a withdrawal of the majority of those children who are not actually attacked.

The term for which a school ought to be closed is not a matter for which fixed rules can be formulated, but the chief risk of failure is in premature re-opening. A continuous supervision of the infected households is the only sound guide as to the limit of usefulness likely to result from the closing, a month having been in my own experience the usual period in this respect.

Diphtheria is the next disorder claiming attention in its relations to school attendance. My acquaintance with diphtheria in the form of outbreaks has been entirely confined to rural districts. In town communities the only cases I have encountered have been sporadic. In the country, outbreaks limited for the majority to individual households, although of terrible fatality, sweeping off in some instances the whole of the children in a family, have been the most usual form of its incidence. Upon two occasions of general prevalence, wherein several families were attacked under circumstances leaving, whatever may have been the origin of the disorder, no doubt as to the operation of school attendance in its spread, the schools were closed in each case. In one school an examination on the spot of the assembled children disclosed a remarkable prevalence of seemingly common throat affection, unaccompanied by any complaint of subjective symptoms, but noteworthy in view of the established observation that such throat affection is oftentimes antecedent to true diphtheria.

In diphtheria, the disinfection of schoolrooms and school premises is of extreme importance, for the tenacity of its contagion, in the way with which it persistently clings to localities notorious for recurrent outbreaks, leaves no question as to the need for the most careful and detailed precautions.

Here the interval of closure must be also determined by the march of events, and my advice to school authorities is this: always be on the alert against the appearance of throat affections among the children, and upon such occasions communicate forthwith with the sanitary officials.

Measles, the remaining disorder of the class under consideration, is the least amenable at present to control. Public opinion is yet unformed, and will for some time continue to look upon this disorder as one which children are bound to have, and from which there is no escape. So long as this indifference exists, the success of any official preventive action must be ineffective. In its special relations to school attendance, measles, when once introduced, is pretty certain to run through the school, attacking those children susceptible to the disorder.

In common with others, my own observations tend to establish the infectiveness of the catarrhal or pre-eruptive stage. A striking instance of this early infectivity came under my notice this summer in a village school. Two of the schoolmaster's children sickened together, two days before the date proposed for the breaking up for the usual holidays, and on this account the school was closed forthwith. The illness of these children subsequently proved to be measles. Of the fifty-five children attending this school, forty were likewise attacked in the course of the next fortnight, and this in a district where the scattered nature of the population made any other source of infection than the school an improbability. The closing of schools on account of measles, is in my experience of rural districts nearly always a spontaneous result, brought about by the disorganisation consequent upon the absence of children attacked; and unless the attendance of all children with catarrhal symptoms could be prevented, and this at the beginning of an epidemic, I do not see any hopeful means of escape from the dilemma.

In closing what I have had to say from my own standpoint of medical officer of health, as to the conditions of usefulness in closing schools in presence of infectious disorders, I may perhaps be allowed to revert to the most important member of this class of school disorders, scarlatina, and by way of recapitulation conclude with an extract from what I have elsewhere written upon the subject:—"By promptly dealing with early cases of scarlet fever, it ought not to be a matter of great difficulty to prevent the spread of infection in a school, to close which is always a serious affair, leading to much disorganisation and loss of valuable time.

"In the management of boarding-schools and similar institutions, everything will assuredly turn on the promptitude and decision bestowed upon the first cases of sickness.

"In ninety-nine cases out of a hundred, the history of introduction, say, of scarlatina into a boarding-school, is the return of a boy after the holidays with the fever in his system. In a day or two the disorder declares itself, and then is the time for proving the necessity as well as the value of isolation. Every school of this class ought to have a sanatorium, or detached house, in constant readiness for such emergencies. Not only should the boy, his clothes, and his bedding, be forthwith removed to such a place, but his next companions should be kept under observation and apart from the rest of the school, as it is amongst their number that subsequent cases, if any, will appear. In large public schools where the boys are located in several houses, the isolation should extend to the whole of the house in which the first case has broken out. These precautions may appear somewhat strict to those who have had no experience of outbreaks of fever in public institutions, but my acquaintance with the results, painful, annoying, and costly, of their neglect, has convinced me that the utmost practicable precautions—and these cited are practicable enough—that can be taken at such a time can err only on the side of laxity. In the event of an outbreak of fever in a boarding-school, no boy should be suffered to return to his home until after a term of isolation, equal to the maximum latent stage of the disorder.

"The circumstances which may be held to justify the continuance of day schools during the prevalence of scarlatina, are those wherein the children would be otherwise exposed to much risk in playing about the doors, with children belonging to infected families, and chiefly with children barely recovered from illness. Under these circumstances, always provided that due supervision over infected families is maintained, a child runs less risk in regular attendance at school.

"This is particularly true in regard to town and village schools, as distinguished from the smaller schools of scattered country districts, where the children coming from all points and from considerable distances are brought together only during school hours. In these latter, the breaking up of the school during prevalence of scarlatina is in my experience the best and safest course."[1]

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[1] *Facts about Fevers; or, Practical Rules for Preventing the Spread of Infection, especially in Relation to Outbreaks of Scarlatina and Typhoid Fever*, p. 7.

THE PRACTITIONER.

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ANATOMICAL AND EXPERIMENTAL INVESTIGATIONS MADE DURING THE YEARS 1868–69, RELATING TO THE COMMUNICATION OF TUBERCLE BY INOCULATION, AND THE PATHOLOGICAL NATURE OF THE LESIONS RESULTING THEREFROM.

BY J. BURDON SANDERSON, M.D., F.R.S.

(*Continued from* p. 360.)

SECOND SERIES.—EXPERIMENTS RELATING TO THE INOCULATION OF MATERIAL FROM THE DISEASED ORGANS, OR OF BLOOD OF ANIMALS PREVIOUSLY INOCULATED.

OBS. X., *June* 11th.—Three guinea-pigs were inoculated with material of nodules in spleen of No. 1.

No. 25. Killed 119 days after inoculation. *Wound* contained pus, and is surrounded with induration. Numerous masses of caseous material embedded in indurated connective tissue (old abscesses), but no abscesses containing fluid pus were found in the subcutaneous tissue in the neighbourhood, over a space extending from the dorsal spines towards the axilla. Enlargement, induration, and opacity of the subcutaneous glands, particularly the scapular and tracheal glands of the same side as the wound. *Lungs:* Very numerous equally disseminated nodules, many not larger than pin-heads. They are grey centrally, pigmented marginally, many having shreds of lymph attached to their subpleural surfaces. Intervening parenchyma pale. *Liver:* Weight 31 grammes; relation of actual to normal weight 1·5 : 1. No islands. Interstitial deposit of grey semi-transparent material abundant, but very unequally distributed. In the left lobe it assumes the form of nodular growths as large as hemp-seeds; some of them are softened centrally and contain opaque material of creamy consistence. *Spleen:* Weight 3·7 grammes; relation of actual to normal weight 7 : 1. Concave surface smooth. On the convex aspect of the organ, conglomerate nodular masses of three to four lines in diameter exhibiting previously described characters.

No. 26. Killed 87 days after inoculation. *Wound* contains no pus. Two small abscesses in its neighbourhood, the contents of which are caseous. Scapular gland of the same side enlarged, indurated, with partial caseous degeneration, the rest of the gland being of semi-transparent appearance. Other subcutaneous glands not affected. *Lungs:* Numerous and equally disseminated nodules, the largest little more than half a line in diameter. They differ from those previously observed in the complete absence of pigment. *Liver:* Weight 21 grammes; relation of actual to normal weight 2 : 1. A few small islands sharp margin of left lobe, otherwise healthy. *Spleen:* Weight 6 grammes; relation of actual to normal weight 22 : 1. One or two minute nodules along outer margin. Tissue apparently healthy, but unusually firm. Malpighian corpuscles not distinguishable. Bronchial and hepatic glands enlarged and indurated.

No. 27. Died 77 days after inoculation. *Wound* contains a quantity of pus. There are no abscesses in its neighbourhood. Scapular gland of the same side enlarged and indurated, not softened. *Lungs:* Disseminated nodules of unusual hardness occur in different parts; one in the lower lobe of the left lung, as large as a hemp-seed, contains a central cavity and another in the same lung is grey and solid. There are five similar nodules in the right lung. *Liver:* Weight 21 grammes; relation of actual to normal weight 1·3 : 1. Several islands in each lobe, the largest two lines in diameter. Many of them exhibit softening and bile staining in their centres. Each island is surrounded by apparently healthy liver tissue. In addition to the nodules the bevelled edge of one of the lobes of the liver is completely converted into the same material as that which forms the islands. *Spleen:* Weight 3·5 grammes; relation of actual to normal weight 11 : 1. Innumerable miliary nodules, the largest a line in diameter, on convex surface, which are so close to each other that scarcely any of the natural structure of the organ can be seen. They are scattered in corresponding abundance throughout its substance.

In this observation, in which the period intervening between inoculation and dissection was longer than before, the retrogressive changes by which the disease would probably have undergone spontaneous cure under favourable circumstances were seen in each case.

Obs. XI., *June* 25th.—Three guinea-pigs were inoculated with material of nodules in spleen of No. 2.

No. 28. Died 16 days after inoculation. A sub-peritoneal abscess existed between two lobes of the *liver*, and there were two other abscesses in the gastro-hepatic omentum. The other organs were healthy. The liver and spleen were of the normal weight.

No. 29. Died 22 days after inoculation. *Wound* contains pus. The subcutaneous cellular tissue and panniculus from the vertebral spines to the middle line—that is over the whole left flank—are scattered with minute circumscribed abscesses. The glands in both axillæ are enlarged and softened, some of them being converted into abscesses containing a quantity of creamy pus. The left inguinal glands are also enlarged and softened. *Lungs:* Disseminated nodules, all, with one exception, smaller than pin-heads. In the left lung 24 were counted, six in the lower and 18 in the upper lobe; in the right lung 40—13 in the lower lobe, 10 in the middle lobe, and 12 in the upper. The larger nodules project considerably, having grey centres and almost black margins. *Liver* of natural weight. Innumerable islands, all of which are edged with a deep margin of injection, scattered over the surface and throughout the substance of the organ. Tissue otherwise natural. *Spleen:* Weight 0·7 gramme;

relation of actual to normal weight 1·4 : 1. The organ is beset with minute miliary nodules.

No. 30. Killed 148 days after inoculation. *Wound* cannot be discovered. There is no induration of the subcutaneous cellular tissue, and there are no abscesses. The scapular gland of the left side is much enlarged and indurated, but not softened. The other axillary glands are also enlarged; other lymphatic glands normal. *Lungs:* A few disseminated nodules, none larger than one-fifth of a line in diameter. *Liver* perfectly healthy. *Spleen* contains numerous semi-transparent nodules. The animal was inadvertently not weighed.

Obs. XII., *June* 25th.—Three guinea-pigs were inoculated with blood taken from the heart of No. 2 immediately after it was killed. The mode of inoculation was the same as in the other experiments, not more than a drop of blood being employed.

No. 31. Died 80 days after inoculation. *Wound* could not be discovered; there was no subcutaneous induration. The tracheal and sub-maxillary glands on both sides of the neck are enlarged and indurated externally, softened and pulpy in their centres. The axillary and inguinal glands are healthy. *Lungs:* Four or five disseminated nodules, smaller than pin-heads in the right lower lobe; two or three in the right upper. Two nodules of larger size in the left lung. *Liver* not weighed; apparently not enlarged. Five or six characteristic islands, varying in diameter from half a line to a line and a half, softened and bile-stained in their centres, and edged with injection, are observed. *Spleen:* Four or five conglomerate nodular masses project on the convex surface of the organ.

No. 32. Killed 105 days after inoculation. *Wound* contains pus, and is surrounded by induration. Numerous disseminated abscesses in subcutaneous cellular tissue. Right scapular gland much enlarged and softened. Tracheal glands slightly enlarged. Inguinal glands enlarged and softened. *Lungs:* Numerous disseminated nodules as large as pin-heads. *Liver:* Weight 33 grammes; relation of actual to normal weight 1·3 : 1. A grey interstitial nodule in the middle lobe, similar to that observed in No. 25. *Spleen:* Weight 3 grammes; relation of actual to normal weight 5 : 1. It contains conglomerate nodular masses.

No. 33. Died 130 days after inoculation. *Wound* is open, but contains no collection of pus. The surrounding subcutaneous thickening is less than usual. There is a subcutaneous abscess over the gluteal muscles on the right side. Its wall is extremely thin, and it contains cheesy pus. Scapular glands large and indurated, but less enlarged than usual. Tracheal glands in the same condition. *Lungs:* Disseminated nodules somewhat larger than usual, exhibiting much central opacity. *Liver:* Weight 45 grammes; relation of actual to normal weight 2·7 : 1. No islands. Interlobular mottling of the whole surface with characteristic alteration of form. On microscopical examination the interlobular adenoid growth was found to be abundant in every part of the organ. *Spleen:* weight 10·2 grammes; relation of actual to normal weight 25 : 1. It is smooth and of natural form. In section some parts appear pale, others intensely hyperæmic, but there are no nodules. The bronchial and hepatic glands and those of the splenic omentum are enlarged and indurated.

Obs. XIII., *July* 7th.—Two guinea-pigs were inoculated with material from the spleen of No. 24.

No. 34 (Notes by Mr. David Guillod). Died 35 days after inoculation. *Wound* contains cheesy material, surrounded by induration; no abscesses. Axillary glands much enlarged, with cheesy degeneration, but no suppuration. *Lungs* healthy. *Liver:* Weight 14·5 grammes; relation of actual to normal weight 7 :1. Ten or twelve characteristic islands two lines in diameter; tissue of organ apparently healthy. *Spleen:* Weight normal. Two nodules as large as pin-heads.

No. 35. The body was not discovered till *August* 31st, that is two or three days after death, and 55 days after inoculation. It was putrid. The *spleen* contained characteristic deposits, but the other organs appeared healthy.

Obs. XIV., *July* 7th.—Two guinea-pigs were inoculated with material from the apparently healthy supra-renal capsules of the same animal, No. 24.

No. 36. Died 114 days after inoculation. *Wound:* Breach of continuity at point of inoculation covered with a scab, about half an inch from which is a mass of thick, tough, cellular tissue adherent to the integument, riddled with interstices containing caseous pus. Scapular, tracheal, sub-maxillary, and inguinal glands of left side enlarged and softened. No enlargement of glands on right side. *Lungs:* Five or six nodules in left lung, one of which near the apex is as large as a hemp-seed. It is hard externally, softened centrally, and scarcely projects above the surface. The other nodules are much smaller. Numerous similar nodules in the right lower lobe. The right upper lobe adheres loosely to the pericardium and wall of the chest by a layer of granular lymph, which is in some parts continuous, in others consists of sub-pleural granulations scarcely distinguishable without a lens. *Liver* of natural size, one or two small islands in the right lobe. *Spleen* much misshapen, and about 20 times its natural size. Seven conglomerate nodular masses can be distinguished; the largest of these, occupying the centre of the organ, is as wide as a threepenny-piece; its depressed and softened centre is white, the convex margin being of a reddish white. Its sectional surface is white superficially; white, mottled with red, more deeply. Yellow opacities occur, which grate against the knife. In the smaller nodules there is no grittiness. Bronchial glands enlarged and indurated; their sectional surfaces exhibit yellow and opaque patches. The condensed cellular tissue around the œsophagus is beset with white miliary nodules. Hepatic glands also enlarged.

No. 37. Killed 136 days after inoculation. *Wound:* Over the upper dorsal spines was a mass of indurated cellular tissue, containing much fat in its areolæ; on puncturing this mass pus escaped. Both scapular glands enlarged, particularly the right. The other axillary and the tracheal glands were also enlarged and indurated. Their sectional surfaces were for the most part transparent, but showed opaque patches, which grated against the knife. *Lungs:* Numerous disseminated sub-pleural nodules, all of which were semi-transparent. *Liver:* No islands; semi-transparent interstitial deposit exists throughout the organ, most abundantly in the left lobe, where it assumes a nodular form. *Spleen* contains several conglomerate nodular masses, the largest of which is three lines in diameter. Hepatic and bronchial glands enlarged and indurated.

THIRD SERIES.—EXPERIMENTS RELATING TO THE INOCULATION OF MATERIAL FROM THE DISEASED ORGANS OF AN INOCULATED ANIMAL OF THE SECOND SERIES.

OBS. XV., *October* 8th.—Four guinea-pigs were inoculated with material from the spleen of No. 25.

No. 38. Killed 56 days after inoculation. *Wound:* No suppuration, and very slight induration. Scapular gland much less enlarged than in animals previously examined; other axillary glands also slightly enlarged. Neither were softened. *Lungs* and *Liver* healthy and of natural weight. *Spleen* not enlarged; contains two miliary nodules, and its Malpighian corpuscles are distinct, and apparently enlarged. The animal was a large boar, and in good condition.

No. 39. Killed 56 days after inoculation. Scapular gland of left side somewhat enlarged, and slightly softened. Other subcutaneous glands healthy. *Lungs:* Characteristic disseminated nodules, varying in size from one-fifth of a line to a line in diameter, the larger ones having opaque centres, the former being transparent throughout. All exhibit the usual marginal pigmentation. They were carefully examined, and found to present the structural characters already described. *Liver:* Weight 19·5 grammes; relation of actual to normal weight 1·5 : 1. No islands. The external surface exhibits patches of grey mottling, which are particularly abundant near the sharp margins of the right lobe. *Spleen:* Weight 2 grammes; relation of actual to normal weight 6 : 1. Convex surface beset with miliary nodules of remarkable transparency. Bronchial and hepatic glands, particularly the former, enlarged and indurated.

No. 40. Killed 81 days after inoculation. *Wound* unhealed and surrounded by slight subcutaneous condensation and thickening. A small abscess, two lines in diameter, between panniculus and skin, not connected by a cord with the wound, from which it is half an inch distant. Another similar abscess at the same distance, leading to which a cord can be distinguished. Of these two abscesses the former contains caseous, the latter fluid pus. Left scapular gland enlarged and suppurated; right scapular and one or two tracheal glands enlarged and caseous. Other subcutaneous glands healthy. *Lungs* healthy. *Liver:* Apparently healthy. Traces of interstitial deposit. *Spleen:* Conglomerate nodular deposits, none exceeding three lines in diameter. The nodules of which they are composed are opaque internally, semi-transparent externally.

No. 41 is still under observation.

In the preceding experiments of the second and third series the morbid appearances differed in no important respect from those observed in animals inoculated directly with tuberculous material. It is, however, worthy of notice that, although in some of the animals the subcutaneous lesions were quite as extensive as in the experiments of the first series, the local effects were on the whole slighter, and in several instances very inconsiderable. It is also worthy of remark, as regards the morbid appearances in the liver, that in two or three animals, particularly in Nos. 25, 32, and 37, the inter-lobular new growth was so exuberant in some parts of the diseased organs that it formed distinct nodular masses—a circumstance not before observed. In other animals the grey mottling was entirely absent. I am, however, inclined to anticipate that in the further progress of the inquiry it will be found that, whenever the liver is enlarged, interstitial adenoid growth really exists and could be detected by the microscope, even though to the naked eye there seem to be no indications of structural change.

In concluding this section of my inquiry, I draw attention to the following facts, as established with some degree of certainty, and as having an important bearing on the question of the development of the morbid process, that is on the mutual relation of the several lesions to one another:—

1. Suppuration occurs in nearly all cases under the skin at the point at which the tuberculous material is inserted; and in most, the suppurative process is propagated to the subcutaneous areolar tissue in its neighbourhood. It is, however, not essential to the production of the internal lesions; for in two cases there was no trace of suppuration anywhere around the wound.

2. In every infected animal the lymphatic glands corresponding to the place of inoculation were enlarged; usually there was softening; there was always caseous degeneration.

3. In eight infected animals the lungs were free from disease.

4. The liver was probably in no instance absolutely healthy, but the lesions were very variable, no less in their nature than in their extent.

5. In one animal the spleen appeared to be of natural size and structure. With this exception the organ was always enlarged. In many animals there was no apparent change of structure. In others there were new growths, which appeared to consist of overproduction of those elements which the spleen has in common with the lymphatic glands.

6. The internal lymphatic glands receiving their tributaries from diseased organs were always themselves enlarged, indurated, and caseous.

The results of the three series of experiments now related afford an answer to the first of the questions proposed at the outset, so far as relates to the species of animal used. They show that the inoculation of tuberculous matter produces in guinea-pigs morbid changes so constant, both in their anatomical character and development, that they may be regarded as constituting a disease; for in all the organs the appearances observed are much less variable than those we are accustomed to find in idiopathic tuberculous disease of man. The true relation of the human disease to its bestial derivative cannot yet be determined.

The second part of the question cannot be decisively answered at the present stage of the inquiry. Anatomically the disease may be defined as primarily an overgrowth of the lymphatic glands, and of those structural elements of other organs which they have in common with the lymphatic glands. But anatomical characters afford no sufficient basis for a definition. If the chemical nature of that transformation of tissue which gives cheesy yellow tubercle as its result, were more thoroughly understood, it would probably be possible to found a definition upon it.

PART II.—PREVIOUS RESEARCHES.

Ever since Laënnec[1] produced a growth which he regarded as tuberculous, on the forefinger of his left hand, by accidentally scratching it with a fragment of bone while engaged in the post-mortem examination of a patient who had suffered from vertebral caries, the notion that tubercle might be communicated by inoculation has from time to time suggested itself to the minds of various pathologists. It was not, however, until Villemin drew attention to the many facts which render it probable that tuberculosis is the manifestation of a morbid action pervading the whole organism, and that in its development and propagation it is governed by the same conditions as the so-called zymotic diseases, that the subject assumed its present importance. It was the consideration of these facts, and particularly of the close relation which seemed to him to exist between tubercle and a disease peculiar to the horse, viz. farcy,[2] that induced M. Villemin to undertake those remarkable experiments which form the basis of the present inquiry. From these experiments he concluded that tuberculosis must no longer be regarded as a constitutional malady, but as one dependent on a specific infection—in short, as a zymotic disease.

Since the publication of these results other pathologists[3] in France, England, and Germany have followed in Villemin's track. The fact that a morbid process, having a certain general resemblance to that by which tubercle is formed, is set up in animals inoculated with tuberculous material, has been abundantly proved, but the interpretation given by different observers differs widely. . . . Nor is this in the least to be wondered at if we take into consideration the complicated nature of the questions involved, the novelty of the facts, and their apparent antagonism to those notions about tubercle which have been hitherto regarded as the teachings of experience.

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[1] *Traité d'Auscultation Médiate*, 1837, Forbes's Translation, p. 331.

[2] The details of these experiments are given at length in the Bulletins of the Academy of the dates corresponding, as well as in M. Villemin's work, *Etudes sur la Tuberculose*, Paris, 1868.

[3] The following are the references to the most important researches published before 1868 :—Prof. Lebert and Dr. Oscar Wyss: Beiträge zur Experimental-Pathologie der heerdartigen umschriebenen disseminirten Lungenentzündung, so wie der Uebertragung der sogenannten Tuberculose und anderer entzündlichen und verschiedenen neoplastischer Producte von Menschen auf Thiere. Virchow's *Archiv.*, vol. xli. 1867.—Dr. A. Roustan, *Récherches sur l'Inoculabilité de la Phthisie*, Paris, 1867.—Dr. Waldenburg, Die Impfbarkeit der Tuberkulose, Allg. Medicin. *Central-Zeitung*, 18 Dec., 1867.—Dr. V. Feltz, Résultats d'Expériences sur l'Inoculation de Matière Tuberculeuse, *Gaz. Méd de Strasbourg*, Oct. 25, 1867.

In giving an account of these theories the precedence is evidently due to M. Villemin, not merely because his experiments were the earliest, but because he is better known in connection with the subject, at all events in this country, than any other pathologist. His investigation was not undertaken by chance, but in obedience to a conviction previously existing in his mind that *tubercle is a zymotic disease.* To this conviction he had been led by the following considerations; with reference to which it may be remarked that even if the facts on which they are based were indisputable, their bearing on the question is indirect. (1) Tubercle, like the zymotic diseases, is rarely met with in elevated situations; (2) it is most prevalent in crowded populations and especially in great manufacturing and commercial towns; (3) persons who live in common and are confined in their dwellings, such as prisoners, inmates of monastic institutions, &c., are liable to tubercle, while (4) those who live in the open air or lead a nomadic life are comparatively exempt; (5) the frequency of tubercle is greater amongst soldiers when in barracks, than in armies in the field; (6) those who live with phthisical individuals " in close and ill ventilated dwellings " are apt to become phthisical; (7) phthisis, unknown to certain savage races before their intercourse with Europeans, is now their most destructive scourge; (8) bovine phthisis prevails most among animals that are confined and overcrowded; (9) the antagonism between phthisis and malaria may be explained on the ground that malarious countries are sparsely inhabited; (10) the contagiousness of phthisis has always been matter of common belief; (11) in its development, phthisis resembles several of the zymotic maladies. Thus (*a*) it resembles typhoid fever so closely that it is often indistinguishable from it, the resemblance extending not only to the phenomena observed during life but to the anatomical lesions, which in both diseases have their principal seat in the lymphatic system. The causes which produce them and the ages at which individuals are most liable to be attacked, are similar. (*b*) The likeness of tubercle to farcy is still more striking. In the latter the essential lesion consists in the development of granulations, anatomically identical with those of tubercle, which have their seat more frequently in the lungs than in any other internal organ, and in both diseases the lymphatic glands undergo enlargement, induration, and caseous degeneration. The etiological relations of the two are the same, while the symptoms are so much alike that it is scarcely possible to point out any differences except such as rise directly from the specific differences of the animals affected.[1]

From all these considerations Villemin inferred that tubercle is not merely a form of perverted nutrition, but a specific disease, one in its essence, however various in its manifestations, and that its cause must be a specific infective material capable of transmission from the diseased to the healthy body, and endowed with the faculty of multiplying itself therein so as to reproduce all the original phenomena. Of the truth of this inference he regards the inoculation experiments as proof. "Tuberculosis can be compared only to the virulent diseases . . . How the tuberculous virus engenders tubercle we can no more explain than we can how the syphilitic virus produces secondary syphilis. The proof of the existence of this morbid principle consists in the fact of successful inoculation . . . Every morbid material is a virus which, when introduced into the organism in small quantities, determines lesions which are constant in their character, and can be shown to exist after the lapse of a certain time in different and remote parts of the body in increased quantity," and this definition he holds to be fully applicable to tuberculous matter.[2]

Mr. Simon, when communicating to the Pathological Society his verification of M. Villemin's experiments, did not offer any theory of the facts, but was careful to state that his "testimony to the genuineness of the very important pathological discovery which M. Villemin claims to have made" must be understood to be "subject to such qualifications as an amended pathological definition of 'tubercle' may hereafter render necessary."

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[1] M. Villemin points out, that the fact that these two diseases are antagonistic is no argument against their analogy, any more than the antagonism of vaccination to smallpox would afford ground for denying the close alliance which exists between the latter and cow-pox.

[2] Villemin, *loc. cit.* p. 589.

From Villemin let us turn to the learned and laborious professor of Breslau. In concluding his first paper, Professor Lebert says that his own results and those of Villemin prove that in tuberculosis just as in smallpox, syphilis, and farcy, we have to do not with a simple inflammatory process which spreads *de proche en proche,* but with a special element belonging exclusively to tuberculous disease. This opinion is, however, expressed with great caution, for says Lebert, "the experimental investigation of the subject is as yet scarcely begun." Any modification of the current etiological doctrines of organic diseases should be received "with the utmost reserve and under the control of a criticism as sober as it is severe."[1] In his second paper the author displays still greater unwillingness to dogmatise, so that his opinions have to be gathered from such expressions as are scattered here and there throughout his communications. So far as they relate to the most important aspects of the question, viz., the significance of the lesions and the nature of the process by which they are produced, the following passages show that Lebert's present views are in great measure opposed to those expressed in his earlier paper. As regards the significance of the lesions he admits that the condition of the lung observed in inoculated animals is anatomically identical with that which exists in disseminated chronic pneumonia and in acute tuberculosis, but is entirely unwilling to regard the formation of nodules in the lung or elsewhere as constituting *new growth,* the very nature of which he repudiates in the strongest terms.[2] In short, he finds it altogether impossible either to define what tubercle is or to state what are the limits which separate between it and the products of inflammation, and he regards "the whole doctrine of tubercle as governed by inflammation, an inflammation of which the development is the more rapid, the more unfavourable is the condition of nutrition of the whole body, and of the affected tissue in particular, while its progress is accelerated by the absorption of pathological products or of materials produced by their decomposition. The minute granulations which we recognise as tubercle are usually produced by the transportation and dissemination of the products of an undoubted primary inflammation, which itself may exhibit all transitions between small granular nodules and extensive infiltrations, and they are as much localised in the tissues belonging to the type of the connective tissue as in the epithelial tissues. True tubercular granulation is therefore closely allied to the inflammatory processes from which it has originated, and of which, indeed, it is the product." This appears not only from their development, from the mode of extension of the granulations, and from their relation to surrounding parts, but from the characters of the more diffused cell-proliferations which take place in their neighbourhood.[1]

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[1] *Bulletin de l'Acad. de Med.* tom. 32, p. 151.

[2] "Ein jeder fühlt sogleich wohin eine so extravagante Begriffs-Erweiterung und Verwirrung führen würde," *loc. cit.* p. 564.

As regards the mode in which the infection takes place, Lebert considers the influence exerted by inoculation as probably partly chemical, partly mechanical. A purely mechanical stimulus appears to him insufficient to explain the facts; "the existence of a purely chemical one is not proved, and certainly would be difficult to prove, so that it is only by exclusion that we can judge how much of the observed effect ought to be provisionally assigned to chemical stimulation, as being inexplicable mechanically."[2] He thinks it probable that at the point of inoculation "an infective fluid is formed from the material inoculated and from the products of inoculation, which, conveyed through the lymphatic and sanguiferous blood-vessels, enters into corpuscular combinations" (in the blood?) "and so produces stimulation and obstruction. The conveyance of material by the lymphatics produces stimulation and proliferation of cells in the lymphatic glands, manifesting itself either in infiltration or granulation. . . . But it is through the blood-vessels that the organism is more thoroughly and deeply infected. Infective material in a broken-down, more or less emulsive condition, or secondary inflammatory products, are absorbed by the capillaries. . . . All these elements pass without difficulty through the venous trunks, and probably undergo corpuscular transformation. . . . Having arrived at the right auricle the carriers of infection" (which Lebert thinks are probably cells newly formed in the blood) "pass into the lungs, and for the most part stop up the capillaries like little emboli. Others, however, go through, and so find their way to the left side of the heart and the systemic circulation. For the most they miss the openings of the ascending arteries. . . . so that the greater number pass into the descending aorta, and thence into the cœliac axis, whence it happens that the liver and spleen are much more frequently infected than the kidneys."

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[1] The above sentences are rather freely translated, the peculiarities of Prof. Lebert's style being such that a literal rendering would be unintelligible.

[2] Lebert, *loc. cit.* p. 576.

"How then does the infection take place? . . In all probability the general laws of cell stimulation and proliferation have much more to do with it than specific peculiarities of the infective juice; for it is to be observed that the same cells are stimulated to proliferation by agents of different nature, and on the other hand that the same agent stimulates different types of cells; in fact the several cells show no differences of type excepting such as may be accounted for as different stages of progressive and retrogressive metamorphosis. Similarly the products of the disintegration of primary granulation or infiltration become new centres of infection, the influence of which radiates and extends to more distant parts, so that the infective material may increase very considerably in the organism." To explain this secondary process as purely mechanical, Lebert regards as "not unphysiological; but the connection of the secondary foci with the primary focus can only be explained by admitting the existence of a special tendency, perhaps a special element of transmission. But let us beware," he continues, "of identifying the inflammatory infection with which we are now occupied with neoplastic or heteroplastic infections, such as cancer, cancroid, &c."[1]

In the preceding paragraphs I have endeavoured to bring together Professor Lebert's opinions in such a manner as to render them intelligible. In reading his paper one cannot help regretting that he has allowed his views of the nature of the tuberculous process to be so powerfully influenced by his conviction of its inflammatory nature.[1] In spite of his determination to refer everything to non-specific tissue stimulation, he is obliged again and again to admit that other influences are at work, but does not seem to see that in yielding so much he yields all. Once allow that the stimulus is chemical as well as mechanical, " specificity " can no longer be excluded ; for clearly if the effect is chemical the agent must be a specific substance, a proximate principle, for chemistry does not recognise " tendencies." To admit that there is a "*besonderes Element der Uebertragung*" in the blood, and at the same time to deny specificity, implies that he who does so, uses the word in a very peculiar sense.

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[1] Lebert, *loc. cit.* p. 578.

M. G. Colin, to whom the communications of M. Villemin to the Academy of Medicine in Paris were referred for a report, admits that the experiments made by him prove that tubercle is a contagious disease, but refuses to entertain his conclusions as to its dependence on a specific virus. He regards the whole process as purely mechanical, attributing the lesions to the reception of morbid products into the lymphatic vessels, not by absorption through their walls, but by the " open mouths of wounded capillaries and lymphatics." The course which the effective material follows may be easily traced, especially when pus is mixed with the tuberculous matter, by the engorgement of the lymphatic vessels and the enlargement of the glands. Its progress is so slow that it is not until several weeks have elapsed that it arrives at its destination in the internal organs, where it assumes the form of little masses (*amas*), evidently regarded by M. Colin as products of local inflammation.

In the discussion of M. Colin's report which took place on the 15th of last October, M. Chauffard, in a speech of great length, compared the effect of inoculation to the fecundation of one tissue by the contact of elements emanating from another, the fecundated tissue being thereby caused to produce histological elements not resembling its own, but those of fecundating tissue. The proliferation which occurs in the affected organs is due according to M. Chauffard to a stimulation of their structural elements, which is strictly local and altogether independent of any general morbid infection or virus. This local stimulation shows itself more especially in the lymphatic glands, the tissue of which may in fact be regarded as the "matrix destined to be fecundated." It is towards them that the tuberculous matter is conveyed by the lymphatics; "the histological elements of which they consist (lymphatic cells or corpuscles) are so nearly allied to those of tubercular granulations, that most of the German-pathologists have regarded them as identical, and have considered tuberculous granulation in general as a heterotopical formation of normal lymphatic elements." Like M. Colin, M. Chauffard regards Villemin's experiments as having no bearing whatever on the specificity of tubercle; but he declines to follow M. Colin in his opinion that tuberculosis is contagious. Willingly admitting that the local disease is in reality tuberculous proliferation, and that the disseminated nodules in the lungs and other organs are tubercles, he denies that "the general affection known under the name of tuberculosis" is really communicated to the inoculated animal.

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[1] " Für uns dominirt die Entzündung die ganze Lehre der Tuberculose," *loc. cit.*

Dr. Waldenburg holds that the process induced by inoculation consists in the intussusception of finely-divided particles, smaller, or at all events not larger, than blood-corpuscles, and in their being deposited in various organs. These particles becoming lodged in the capillaries of internal organs, finally escape out of the circulation by penetrating the vascular wall, in which escape he thinks it possible that they may be accompanied by colourless blood corpuscles, and thus originate miliary granulations in the neighbourhood of the vessels.[1] He thus holds a position nearly identical with that of M. Colin, although his views are much more clearly and definitely expressed. He regards them as applicable not only to the results of inoculation, but to the development of human tubercle, and thinks that clinical experience justifies the conclusion that, in man as in inoculated animals, miliary tubercle is produced in the tissues of affected organs by the deposit of extremely fine particles previously received into the blood-vessels. At the same time he admits that this mechanical process does not constitute the essence of tuberculosis, for without reference to the facts which show phthisis to be a diathetic disease, its hereditary transmission can scarcely be explained unless it be granted that it consists of something more than anatomical lesions. Like Professor Lebert, Dr. Waldenburg expresses himself with great caution, and conceals from himself and from his readers his belief in what other people designate the tubercular diathesis, by speaking of an "hereditary susceptibility to stimulation," and so forth.

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[1] Dr. Waldenburg considers that the researches of Cohnheim have demonstrated the possibility of the escape of blood-corpuscles from the capillaries, independently of rupture.

From the preceding summary of the views entertained by the principal pathologists who have directed their attention to the subject, it will be seen how numerous are the aspects in which the results of tubercle inoculation may be regarded, and how complicated are the questions which arise out of them. It is important, however, to notice that in so great a diversity of opinion there are certain particulars in respect of which all are agreed. Thus it is generally admitted that the certain result of the inoculation of tuberculous matter of whatever kind is to produce crops of miliary granulations in the lungs and other internal organs; that these granulations are anatomically identical with grey tubercle, that they become yellow and opaque, and eventually break down into a soft cheesy material. It is further admitted on all hands that the process is, so to speak, a self-diffusive one, that in the act of inoculation a new element is introduced into the inoculated animal at the point of insertion, from which it is disseminated to all parts of the body through the lymphatic and arterial circulation.

At this point agreement ceases. It is neither agreed what the new element is, nor what is the nature of its effect on the blood, or on the living tissues to which the blood-stream carries it. With reference to these questions we find three views indicated. They may be expressed as follows: (1.) The material introduced consists of microscopical particles, possessed of no properties excepting those they owe to their hardness, form, and magnitude, and therefore capable of producing no effects excepting those of mechanical irritation. (2.) The material consists of living matter, capable either of growth by assimilation of new matter similar to itself, or of causing morbid transformations in the tissues with which it comes into contact; in either case acting in a specific way which cannot be referred to its physical properties. (3.) It is a definite chemical compound which is soluble in the blood plasma, and has a special and exclusive action on certain tissues, particularly that of the lymphatic glands and other analogous structures.

Practically, the first and second of these propositions are the only important ones ; for, although Professor Lebert has suggested the co-operation of a chemical with a mechanical action, he has given no explanation of his meaning. That it is possible to conceive of such an agent as is described in the third proposition can scarcely be disputed, but the extremely small quantity of the material used, taken together with the postponement and protracted duration of the results, are facts of which no intelligible chemical explanation can be given, so that the tissue may be narrowed, so far as relates to the origin of the morbid process, within the limits indicated in propositions 1 and 2. If, on the one hand, the lesions can be fully accounted for by the entrance of minute particles of hard, but absolutely insoluble and innocuous material into the arterial circulation, we are bound to accept this explanation as the simplest, and to admit with Prof. Lebert that the granulations are merely circumscribed inflammations. If, on the other hand, none of the effects can be explained on this mechanical principle, little seems to be left to us but to admit that the contagium of tubercle acts in the same way as the contagia of the so-called specific diseases. Lastly, if the distribution of the granulations and their similarity to those produced mechanically should seem to suggest that their mode of origin may be mechanical, while other influences manifest themselves in their development, we are perfectly at liberty to adopt the mechanical explanation, so far as it goes, and to supplement it with such other explanations as the facts may warrant.

Postscript.—(March 31, 1868.)—Observations which I have had the opportunity of completing since this report was in type, afford evidence of so important a character in support of some of the conclusions embodied in it, that I gladly avail myself of the opportunity which has been afforded me of adding the results.

It has been found that if animals are inoculated with pus derived from the secondary abscesses of patients affected with pyæmia, death is apt to occur during the third or fourth week after inoculation, in which case the result of dissection is as follows:—Abscesses are found at the seat of inoculation, and purulent deposits in the neighbouring subcutaneous tissue; these, although obviously of the same character as those observed after inoculation of tubercle, differ from them in being larger, more numerous, and more generally distributed. The subcutaneous lymphatic glands are healthy, or at most a little enlarged. The internal organs are usually free from disease. When this is not the case, lesions of an obviously inflammatory nature are found; as for example, pleuro-pneumonia, pericarditis, or sub-pleural or sub-peritoneal abscesses. If, on the other hand, the animals survive the primary, *i.e.* pyæmic, effects of which these lesions are the expression, and are examined several months after inoculation, morbid appearances are found in the lungs, liver, and spleen, in which all the anatomical characters of a tuberculous process are to be recognised.

From these facts it is evident that these lesions can no longer be regarded as dependent on any property or action possessed by the inoculated material in virtue of its having been taken from the diseased organs of a phthisical patient. This conclusion is rendered almost certain by the result of the following experiment. On the 29th of October last, setons of unbleached cotton were inserted, by means of a needle which had not been used before, in the shoulders of two guinea-pigs, which from their being entirely white could be easily distinguished from any of the other animals under observation, all of which happened to have spots of colour. One of these animals was killed on the 28th of December, and was dissected by Mr. Simon and myself. One of the setons was surrounded by a hard mass of semi-transparent substance—obviously dried-up pus, which was surrounded by connective-tissue induration. The other abscess was of considerable size; the material contained in it was of the consistence of cream cheese, and on microscopical examination the corpuscles of which it consisted were found to have the characters already described. The internal organs were perfectly healthy. The other animal died on the 15th of March.

There were two open wounds on the left shoulder, each of which led to a sinuous cavity, containing a small quantity of pus, the greater part of the contents of the abscesses having escaped externally. Both cavities were connected with each other and with the neighbouring scapular gland, which was enlarged and softened, by subcutaneous bands of induration, and there were numerous purulent deposits in the neighbouring muscles and areolar tissue. The lungs contained very numerous iron-grey nodules. The liver was much enlarged, and presented the characteristic appearances of interstitial adenoid deposit. In the spleen there were numerous miliary nodules. There was enlargement of the agminate glands both of the large and small intestines, as well as of the lymphatic glands in the gastro-hepatic omentum and mesentery. In this case, therefore, a pathological process which had originated in traumatic subcutaneous suppuration resulted in lesions which were characteristically tuberculous.

From these experiments I concluded (1869) that

[In rodent animals the tuberculous process may originate not merely by the inoculation of tubercle, but by any irritation of the requisite intensity applied to the subcutaneous tissue, and that any external injury, provided that the animal survives its immediate effects, is capable of becoming the first link in a chain of pathological changes which cannot be distinguished from those produced by the insertion of tuberculous material. . . . The truth of this inference has now been completely established by the experiments of two of the most competent observers, Dr. Wilson Fox, Professor of Clinical Medicine in University College,[1] and Dr. Cohnheim of Berlin. The following paragraph contains a summary of their results, which are the more valuable as they were arrived at altogether independently and without knowledge either of each other's inquiries or of mine.

From the tabular summary of Dr. Fox's experiments (117 in number), it appears that of 70 animals inoculated with various products derived from bodies of non-tuberculous patients, about half (34) became tuberculous. In addition, five animals were inoculated with putrid but originally healthy muscle, and four of them became in like manner tuberculous, as was found when they were killed at various periods from 84 to 122 days after inoculation. Of seven animals in which setons or other mechanical irritants were introduced under the skin, two became tuberculous.[1] This research, no less remarkable for the accuracy and completeness of the anatomical details than for the conclusiveness of the experiments, was followed only the other day by another in Berlin, which although of similar nature appears by internal evidence to have been conducted in entire ignorance that several of the questions investigated had already been completely settled in England. Drs. Cohnheim and Fränkel, for the purpose of obtaining an answer to the question, "Does artificial tubercle owe its origin to a specific virus?"[2] introduced into the peritonæal cavities of guinea-pigs portions of various tumours (carcinoma, sarcoma, condyloma, &c.), as well as of healthy but partly decomposed tissue. Subsequently they employed in the same way a variety of insoluble inert substances, such as blotting-paper, charpie, gutta-percha, caoutchouc, vulcanite, &c. In those animals that survived the immediate effects of the injury, emaciation supervened sooner or later, and the animals eventually died with tuberculosis of the peritonæum, liver, spleen, lungs, and other organs, the morbid appearances corresponding in every respect with those described in my last report.

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[1] *On the Artificial Production of Tubercle in the Lower Animals.* London: Macmillan & Co., 1868.

As regards the bearing of the facts of inoculation on the general question of the nature and origin of tuberculosis, I concluded from my own observations that there is no structural distinction between the artificial disease and human tubercle, so long as the term is confined, as all accurate writers are now accustomed to confine it, to miliary tuberculosis; but I considered it necessary to maintain a reserve as to its relation with the many pathological processes which are spoken of as tuberculosis in the common language of practical medicine and surgery. In going so far the two distinguished pathologists already quoted have fully agreed with me. Dr. Fox says: "I must confess that sceptical as every one must naturally at first feel on this subject, the cumulative force of the evidence in favour of the tubercular nature of these growths appears to me irresistible. We are either dealing with tubercle, or we have before us a new and hitherto unknown constitutional disease of the rodentia, consisting of growths which, in their naked-eye appearances and histological characters, correspond with all the essential features of tubercle in man; which occur not only in the organs which are the chosen seats of tubercle in man, but also in the same parts of those organs; which have the same vital characters and the same early degenerative cheesy changes, not suppuration nor acute softening, and with no marked characters sufficient to distinguish them from tubercle." Cohnheim says: "All the marks by which tubercle is characterised, as such, are present; the agreement of the product of inoculation with human miliary tubercle could not be more complete than it is, whether regard be had to its extended distribution, and to the great variety of organs affected (peritonæum, pleura, lungs, liver, spleen, lymphatic gland, and even the choroid), or to its macroscopical and microscopical characters."]

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[1] It is of importance to note that all these experiments were completed before the appearance of my last report.

[2] Cohnheim and Fränkel. "Untersuchungen über die Ueberträgbarkeit der Tuberculose auf Thiere." Virch. *Archiv*, bd. xlv. 1868, p. 216.

The results of the inquiry were summed up in the following propositions :—

Conclusions.

1. The characteristic product of tuberculosis is not an aggregation of shrivelled particles of irregular form, but a tissue composed of lymph corpuscles held together by a network of hyaline connective substance.

2. There is a close structural analogy between this tissue and that of certain follicular organs belonging to the lymphatic system, *e.g.* the follicles of Peyer, the ampullæ of the lymphatic glands, &c.

3. All the favourite seats of tubercle are naturally characterised by the presence of this tissue, which, from the analogy stated above, may properly be called *adenoid.*

4. The natural distribution of adenoid tissue in the body is in intimate relation with the lymphatic system. In the great

serous membranes (which v. Recklinghausen's discoveries have taught us to regard as walls of lymphatic reservoirs) it forms sheaths round the blood-vessels, or masses of microscopical dimensions and irregular contour underneath the epithelium. In the solid viscera it is distributed here and there in the course of the lymphatic channels.

5. In the peritonæum, tuberculosis primarily consists in the enlargement or overgrowth of these sheaths or microscopical masses of adenoid tissue, and consequently the tuberculous nodules which are formed have the same intimate structure, and stand in the same anatomical relation to the vessels and epithelium. In the viscera the essential lesions also consist, not in new growth, but in overgrowth of pre-existing masses of adenoid tissue.

6. The primary local lesion in artificial tuberculosis, whether the cause be simple wound or specific inoculation, consists in the development at the seat of injury of granulations or nodules which have similar structural characters with those of adenoid tissue elsewhere, but cannot as yet be shown to be in relation with the absorbent vessels.

7. The first step in the dissemination of tubercle consists in its being absorbed primarily by the lymphatics (which convey it to the lymphatic glands of which they are tributaries), and secondarily by the veins. Having thus entered the systemic circulation, it is distributed universally by the arteries. The serous membranes seem, however, by preference to appropriate it, and from them it extends by contiguity to the superficial parts of the organs which they cover.

8. The final stage of the process consists in the tertiary infection of the glands of each diseased organ, which glands consequently undergo enlargement and induration, and eventually become partially caseous. The enlargement is due to the multiplication of cells in all the tissues of the organ, but more particularly in the alveoli—the hardening to a process of fibrous degeneration—while the caseation consists in slow necrosis of the previously hardened and anæmic parts. From the first the gland is incapable of performing its functions, but it is not until induration commences that the absorbents of the organ to which it belongs are completely obstructed.

9. In the liver of the guinea-pig, and in some other organs, tuberculous tissue undergoes a fibroid degeneration and caseation, the results of which cannot be distinguished from those observed in the normal adenoid tissue of the lymphatic glands and of the spleen.

10. As regards the question of a *specific contagium* of tubercle, we think it very important to note that this is not as yet disproved by the facts of traumatic tuberculosis. It still remains open to inquiry whether or not injuries which are of such a nature that air is completely excluded from contact with the injured part are capable of originating a tuberculous process. The results of the following experiments undertaken at the instance of Mr. Simon, with special reference to this question, seem indeed to suggest that they may not be so. Setons steeped in carbolic acid were inserted in ten guinea-pigs on the 24th of September, 1868, each animal receiving two. At the same time extensive fractures of both scapulæ were produced on five others, care being taken not to injure the integuments. No tuberculosis or other disease of internal organs resulted in either of the cases. The facts certainly point to the necessity of further investigation in this direction.

THE TREATMENT OF INFANTILE DIARRHŒA BY CHAMOMILE INFUSION.

BY CHRISTOPHER ELLIOTT, M.D.,

Physician to the Bristol Hospital for Sick Children.

THE subject of infantile diarrhœa may appear to some minds so very commonplace that an apology might almost be expected from me for bringing it forward in the pages of *The Practitioner*. But, if any is needed, my excuse is the importance of the subject, which is proved by the fact that the Local Government Board have undertaken an inquiry into it; and when we further bear in mind that at least three-fourths of the deaths from diarrhœa are those of children under one year, and a fifth are of children between the ages of one and five. Surely, nobody will consider such a "massacre of the innocents" a satisfactory state of affairs, and it should be our aim as practical physicians to reduce this high mortality. In drawing attention to the infusion of chamomile, I believe we have here an efficient, though homely remedy, whose virtues require to be but more widely known than at present seems to be the case in order to be more generally employed.

The flowers of *Anthemis nobilis* have long been an article of the Materia Medica, and were formerly held in high estimation as stimulants and tonics, especially in dyspepsia. Squire, in his *Companion to the British Pharmacopœia,* defines its medicinal properties as tonic, aromatic, and stomachic; and in large doses as emetic. In his *Dispensatory,* Christison states that in ancient times the powder was much used in agues, and that Cullen spoke favourably of its effects. At the present time other remedies have supplanted this drug in medical favour for these ailments, but, as a popular domestic medicine for sick headaches, the simple infusion under the name of chamomile tea still retains its place.

Searching for a cheap and simple remedy for infantile diarrhœa, and one that at the same time should be less dangerous than opium and its compounds, so often administered by ignorant mothers and others under the name of "soothing syrup," my thoughts were directed to the infusion of chamomile flowers, from having observed its good effects in the flatulent dyspepsia and colic of young children. Unaware that Ringer had recommended it, I was led to test its value in infantile diarrhœa, and my first trials having proved satisfactory, I now seldom employ any other remedy in this complaint. My observations completely endorse those of Ringer, for I find it especially useful in the diarrhœa connected with dentition, when the stools are many in number, green in colour, or are slimy, and streaked with blood. The presence of pain and cramp I consider the best index for prescribing this medicine, as a few doses will quickly calm and quiet a fretful child. The dose of the infusion is ʒss-ʒi, for a child under one year, and for a child over that age double that quantity, given three times a day or oftener, according to the severity of the attack.

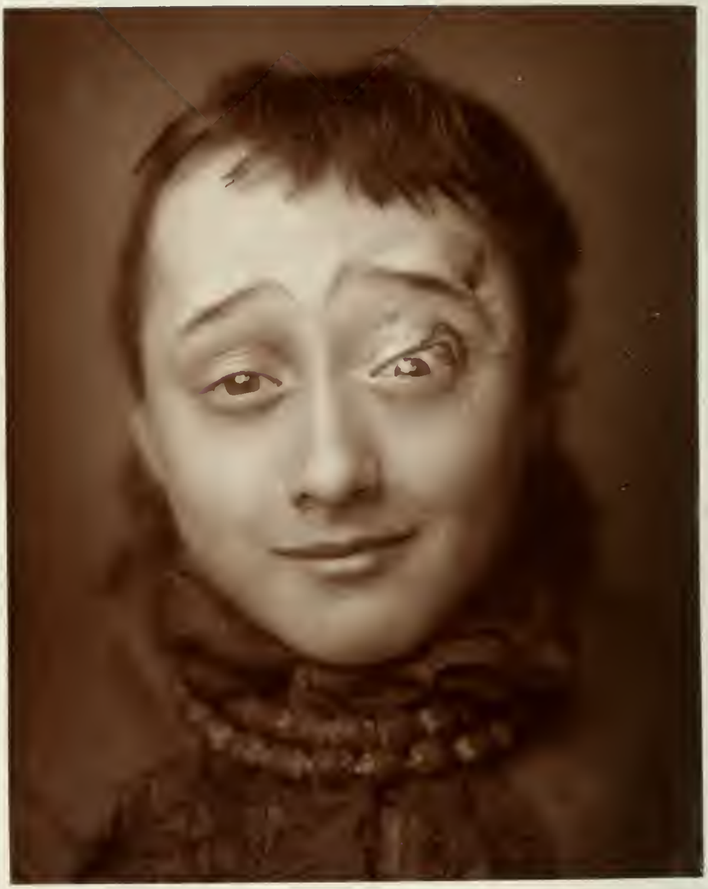
The rationale of the treatment is explained, I believe, by the power which chamomile flowers possess of subduing reflex excitability. This power belongs especially to the volatile oil contained in them, for, according to Grisan, a decapitated frog fortified with a dose of chamomile oil was not capable of being tetanised by a dose of strychnine, which threw an unprotected frog of similar size into convulsions; and *vice versâ*, where reflex excitability had been artificially produced by strychnia, it could be calmed again by chamomile oil.

ON THE TRANSPLANTATION OF SKIN *EN MASSE* IN THE TREATMENT OF ECTROPION AND OTHER DEFORMITIES.

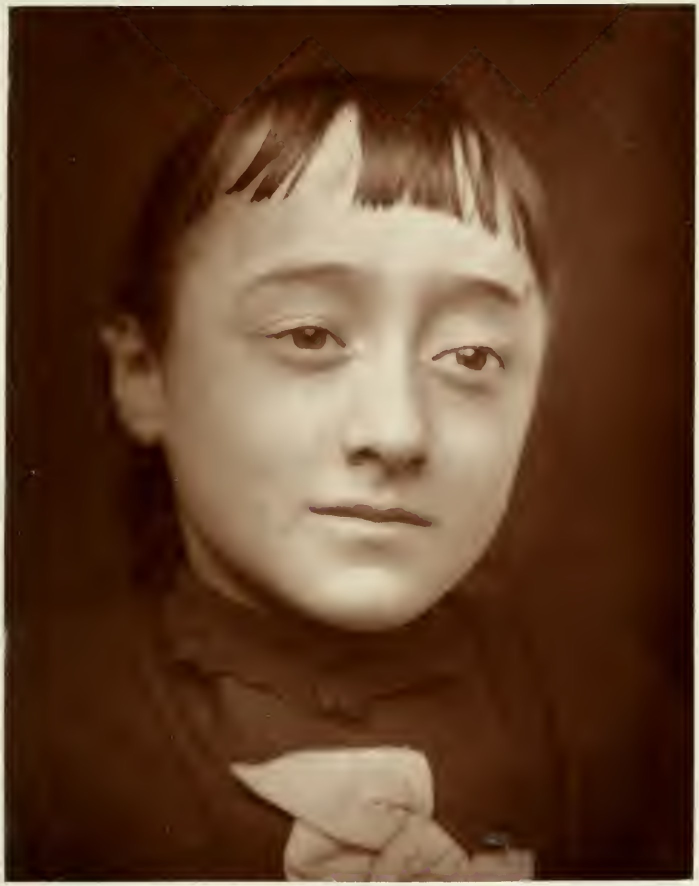
BY CHARLES BELL TAYLOR, M.D., F.R.C.S.E.,

Surgeon to the Nottingham and Midland Eye Infirmary.

The transplantation of skin from one part of the body to another, and from one person to another, without pedicle, is a subject of so much importance that I cannot doubt that a brief record of cases in which this operation has been performed by myself will be acceptable to the readers of *The Practitioner.* Although this method of treating deformities has not attracted much attention until recently, it was practised in 1818 by C. F. Graefe, who transplanted a piece of skin the size of a fourpenny-piece; and Mr. Lawson, the well-known ophthalmic surgeon, succeeded in 1870 in establishing a graft the size of a shilling; in the same year Leon Lefort, one of the surgeons to the Hotel Dieu, demonstrated that it was possible to transplant pieces of cuticle without pedicle, and the subject has since been so exhaustively treated by Dr. Wolfe, of Glasgow, that the operation is now very generally associated with his name. Both Lefort and Wolfe insisted upon the absolute necessity of scraping the under surface of the flap until every shred of subcutaneous tissue was removed, and Abadie and others who have practised the operation insist upon the necessity of a like precaution. My own experience, which is not in accord with the above-named authorities, dates from March 1875, when I was induced to replace a large piece of skin that I had removed from the upper eyelid of a lady, in order to remedy a very marked degree of ptosis. So much skin



SKIN GRAFTING.—DR. BELL TAYLOR.
No. 1.—Before operation.



Skin Grafting. — Dr. Bell Taylor.
No. 2.—After transplantation of skin.

had been removed that the eye would not close, and I determined to replace it. No precautions whatever were taken, and although the flap had been separated from the body for nearly half an hour, and was apparently quite dead, the wound healed like a cut finger. So remarkable a success made a great impression on my mind, and being unaware at the time of what had been done in this direction by Lefort and others, I came to the conclusion that I had stumbled upon a discovery of some importance, and accordingly brought the case in question, together with a child in whom I had replaced the eyelid by a flap taken from the arm, under the notice of the members of the British Medical Association at the annual meeting when held in Leicester in 1877. The accompanying photograph exhibits a very similar case to the one then presented to the notice of the meeting. It is, as is evident at a glance, a bad case of deformity, the result of ectropion, caused by extensive exfoliation of diseased bone in a delicate and scrofulous subject.

This child, who came from a distance, had been seen by other surgeons, and some attempt had been made to remedy the deformity; but the small portion of the upper lid, which had escaped destruction, was so firmly embedded in the diseased tissue that it was evident that nothing but a most careful operation with transplantation of new skin, necessarily from a distant region, would suffice, while it was clear that, unless something was done, the eye, constantly open, congested, and perpetually exposed to external irritation, would be seriously damaged. It was impossible to preserve a pedicle while transplanting from a distant region, as the patient was exceptionally timid and irritable. I therefore decided to transplant *en masse*, and selected for the purpose a piece of delicate skin from the inside of the arm. The upper lid, as may be noticed in the photograph, was turned completely inside out, and I took advantage of this position to make a raw surface well within the lashes; a similar raw surface was established on the opposing edge of the lower lid; what remained of the eyelid cut free from its deep-seated attachments, and the two raw surfaces brought together and firmly attached by sutures deeply placed in the lids. The upper portion of skin, which was buried under the orbital ridge, was then carefully dissected out, and the raw surface between the two covered with the flap borrowed from the arm. The triangular indentation immediately over the brow was filled up with another piece of skin, and the part saturated with a solution of boracic acid in cotton wool, which was maintained *in situ* by a compress bandage. The lids adhered, thus establishing a permanent anchyloblepharon, and, with but a slight threatening of sloughing at the edge, the transplanted skin became firmly attached in its new situation. I maintained the anchyloblepharon for six months, when, finding that the lid was firmly embedded in its new situation, I divided the attachments between the lids, and dismissed the case with the result depicted in the second photograph.

I may here remark that in establishing an artificial anchyloblepharon in order to treat ectropion, transplant tissue, or for any other purpose, it is most important to maintain the eyelashes intact, and, in order to do so, to make the raw surfaces well within the edges of the eyelids, and to maintain apposition by sutures deeply placed. An examination of the second photograph shows that this end has been fully attained in the case in question.

In the preceding three cases no preparation of the skin to be transplanted, such as scraping the under surface as recommended by Lefort and Wolfe, was adopted; the skin was simply replaced just as it was removed, with the fine reticulated vascular under surface untouched. In the next two cases I adopted the precautions recommended by these gentlemen, and both sloughed in spite of every care. In my sixth case I therefore replaced the cuticle simply as in my first cases, and although the lid (the lower lid), the subject of the operation, was constantly bathed in pus from a suppurating eyeball, the wound healed like a simple incision, and never gave the slightest trouble from first to last.

I have had other cases since I read a paper on this subject at the Jubilee meeting of the British Medical Association in August last, and am inclined to modify the opinion I then expressed so far as to say that I am disposed to think that, if no peeling of the under surface of the flap is adopted, the percentage of cases of successful transplantation would be greater than I then thought possible. I would also remark that the fine silky tissue of the upper lid, which may always be spared, is best adapted for this purpose, and that I have successfully transplanted it on to the lower surface of the eyeball itself, for the cure of symblepharon, both with and without pedicle.

ON ACUTE PHOSPHORUS POISONING WITH AN ACCOMPANYING CASE.

BY W. JOSEPH TYSON, M.D., F.R.C.S., FOLKESTONE.

THE following are brief notes of the case :—

S. W. æt. 20 ; a general servant.—On Thursday evening, January 11th, 1877, she took some phosphorous paste sold under the name of "rat poison," on the next day, Friday, the paste was taken three times ; no more was consumed after this ; the total quantity swallowed of the paste would in bulk be about equal to the size of a common cob-nut.

She was not seen by a medical man until the following Sunday evening ; sixty hours having elapsed since the first dose was taken. The following notes were then made by Dr. Henry Lewis : "I found her in bed ; her pulse was 80 ; no heat of skin ; the breath smelled of garlic. She stated that she was first sick on the Saturday evening, the sickness continuing throughout the night and the whole of the Sunday. She complained of decided tenderness in the epigastrium. Was ordered rest in bed, linseed-meal poultice to the pit of the stomach, and to take arrowroot.

On *Monday, January* 15*th,* Dr. D. Lewis handed the case over to me, and in the afternoon of the same day I saw her. She was in bed looking quite well ; she spoke naturally and sensibly. The only two noticeable points were a slightly yellow tinge of the conjunctivæ and a complaint of soreness in the epigastrium. Treatment ordered was ten drops of the oil of turpentine three times a day, a milk diet with eggs.

Tuesday morning, January 16*th.*—Physically she feels weaker ; has had no return of the sickness ; was thirsty during the night. I carefully examined the thoracic and abdominal viscera, but detected no abnormal physical signs. Breath smells slightly of sulphur; the conjunctivæ are now quite yellow, as well as the skin of the whole body, but more especially that of the chest and abdomen. The urine is full of bile. Pulse 100. Temperature 98°·4. Treatment continued. In the *evening of the same day* the pain still continues in the epigastrium; the bowels have been well opened, the motions containing little or no bile, and having no garlic-like odour; the urine, acid, sp. gr. 1030, contains a fair amount of albumen. Pulse 104. Temperature 99°·6.

Wednesday morning, January 17*th.*—Complains of thirst and great general weakness; pain continues in the epigastrium; no more sickness; breath still smells slightly of garlic; jaundice remains unaltered. There is an increase in the liver-dulness of one and a-half inches below the ribs; spleen cannot be felt. Has taken less nourishment the last twelve hours, preferring toast-water to milk. Temperature 99·2°. Pulse 108.

Ordered some egg and brandy every hour. In the evening of the same day some "wandering" was observed for the first time. Pulse 112, very weak.

Thursday morning, January 18*th.*—During the last night she has been very restless, and sometimes attempted to get out of bed; she spoke coherently to her friends and recognised them. Her motions and urine have been passed under her. Was sick three times during the night and retched several times. The skin is more deeply jaundiced, it is cold; especially the hands and feet. The heart-beats are 104 per minute, and very feebly made out. No pulse at the wrist felt. She died at 11 A.M. The turpentine was continued up till last evening.

The post-mortem was made the next morning, twenty-two hours after death.

The whole skin was jaundiced, especially the chest and abdomen; the body was well nourished. No œdema or subcutaneous hæmorrhages present.

The *Lungs.*—There was little to be seen about them, excepting some congestion at base of left lung and old pleuritic adhesions. No fatty change noticeable.

Heart.—Of average size, fairly firm, the external surface of yellowish appearance, the colour being distributed uniformly throughout. A fresh specimen under the microscope showed marked fatty degeneration of the muscular fibres, the fat granules coming out very distinctly: the transverse striæ of the fibres were destroyed.

Little or no fluid in the pericardium.

Liver.—Average size, externally smooth, pale, and of yellowish colour. On section the cut surfaces were bloodless and also of a yellowish appearance. Surrounding the hepatic vein of each lobule was an irregular circle corresponding to the distribution of the portal vein, which, under the microscope, was more or less made up of fat.

Kidneys.—Of normal size, yellowish externally, otherwise appeared healthy.

Uterus.—Small and empty; no fatty change visible.

Stomach.—The mucous membrane showed no erosions and presented no abnormal change. The serous membrane of the abdomen was of a yellow colour.

Regarding the above case, it may be said that it is a typical one of acute phosphorus poisoning. There are a few points which are especially distinctive of this form of poisoning, and these I will now mention briefly.

The comparative absence of symptoms and signs is strikingly apparent in almost all cases, excepting those which terminate in about twelve hours. In the foregoing case, leaving out the gastric pain, for three and a-half days the patient was to all appearance well, and unless we had had positive evidence of the paste having been taken, the case might have been most easily overlooked. It might have been put down as a case of simple jaundice, and the pain in the epigastrium as an accidental complication. Simple jaundice is common enough in young people and is a condition requiring little or no treatment. It should be remembered that this epigastric pain is the earliest symptom present in this form of poisoning, and should, when coincident with jaundice, be looked upon at least with suspicion.

I have looked over a great many recorded cases, and in these, as well as in my own, the most prominent symptoms are pain in epigastrium, jaundice, thirst, early vomiting, and delirium immediately preceding death. I must not forget to mention the garlic-like smell of the breath, which generally lasts for a day or two after the phosphorus has been taken; in my own case it lasted for four days; but the smell is such as might easily be unnoticed after the first few hours, and one would not test the breath unless there were present some clue to the poisoning.

Hæmorrhagic symptoms are spoken of in some works, but these I believe to be very exceptional; for out of all the cases recorded in the New Sydenham Society's books from 1859 to 1874, amounting to over 100, hæmoptysis, hæmatemesis, melæna, &c., are not mentioned.

It is rather curious that the stomach pain should be so constant a symptom, and yet on post-mortem examination the stomach shows very little change. It has been suggested that the pain is not gastric but hepatic in origin, and that hepatic enlargement is the cause. In the above case there was some enlargement of the liver made out, but at the post-mortem it was apparently of its natural size; a similar condition to this is mentioned in one of the New Sydenham Society's books, the post-mortem not revealing the enlargement of the liver observed during life.

Jaundice does not usually make its appearance until two or three days after the phosphorus has been taken; but this varies much. The vomiting and the thirst are both early symptoms.

The prognosis and the quantity of phosphorus taken are, as one might expect, intimately associated together. The greater the amount of the poison absorbed, the quicker is the death; but not necessarily the greater the amount swallowed the quicker the death, as the very large quantity taken may be, and often is, the only chance the patient has of recovery, because of the severe and immediate vomiting thereby produced. In my patient there was no vomiting until forty-eight hours after the first piece of paste was taken, and she was not seen until twenty-four hours after this, so that there was little hope of doing anything in the way of treatment.

The prognosis is always bad, the majority of the cases ending fatally. It is difficult to estimate the minimum quantity of phosphorus which will cause death. Dr. Stevenson estimated the dose taken in the case here described as under two grains. The forms in which phosphorus is commonly taken are the paste and the heads of matches; and doubtless both preparations vary in strength in different countries. In Germany, where, compared to England, phosphorus poisoning has been common, the more usual form has been by the heads of matches; and in one case, that of a woman twenty-four years of age, six were sufficient to cause death in three and a-half days; but in England, and latterly in Germany, the paste has found more favour. The paste is sold in England in little stone jars, which hold about an ounce. When fresh it is of a greenish blue colour, smells strongly of sulphur, emitting in the dark phosphorescent fumes. In an analysis made of the paste of one of these jars by Dr. T. Stevenson at Guy's Hospital, he found that a jar contained about five and a-half grains of phosphorus. The jars only cost about threepence each, and as there are no government restrictions put upon the sale of them, it is a lamentably easy and cheap method of destroying life. It is strange that such poisons as this and many others can be so easily secured by the lay public, but I am afraid that not until a few more deaths occur and are publicly announced will any really effectual bar be placed upon the sale of dangerous drugs.

Now that phosphorus is so much in vogue as a medicine in various nervous complaints, it is important to recognise early the symptoms of poisoning. In a case under the care of Dr. Moxon in Guy's Hospital, the patient was taking $\frac{1}{40}$ grain of the drug three times a day for locomotor ataxia and commencing general paralysis. Jaundice, vomiting, and pain in the epigastrium came on after twenty-eight days' use of the phosphorus; and the drug was then left off; but the patient was decidedly ill for some days until the above symptoms passed away.

It seems that, in some cases, phosphorus given medicinally at first can only be tolerated with difficulty, but may be afterwards gradually increased even in the case of a child to a dose considerably beyond the limit which is commonly assigned for its use. In a large number of cases of psoriasis Mr. B. Squire has given as much as $\frac{1}{8}$ grain three times a day.

Pathology and Morbid Anatomy.—The fatty degeneration is said to be due both to the diminished oxidation of fat and to its increased production from the transformation of albumen. Why phosphorus should cause this change is not known.

The morbid change consists in fatty degeneration of the internal organs; this change has been found more or less in all parts of the body, viz. in the liver, heart, kidneys, spleen, aorta, tongue, &c.; but more especially in the liver and heart; the change is uniformly distributed in each organ.

Ecchymoses are frequently present. These have been found in the lung, pericardium, mediastinum, pleuræ, subcutaneous adipose tissues, intermuscular connective tissue, and in other parts. In one case there was destruction of the mucous membrane of the œsophagus, of the anterior part of the pharynx and epiglottis. In no case have I found any mention of the coats of the viscera being perforated, although this fact is stated in Guy and Ferrier's *Forensic Medicine*; if it does occur, it is exceedingly rare, and may possibly be due to post-mortem changes.

Treatment.—The drug that was used in my case, viz. turpentine, has been given in many others, but with no definite results; though of course, as with other medicines, recoveries have ensued under its administration. Carbonate of copper, peroxide of hydrogen, nitrate and chloride of silver, have also been given, but with only negative results. The best treatment to adopt is to give a strong emetic very soon after the poison has been taken; but this opportunity is seldom afforded to the medical attendant, as the phosphorus is usually taken with suicidal intent. Moreover it very frequently produces no symptoms or signs whereby it may be recognised until fatal mischief is done.

LINSEED POULTICES: HOW TO MAKE AND HOW TO APPLY THEM.

BY F. P. ATKINSON, M.D.

There can be no question that the successful treatment of disease depends in a great number of instances upon what are apparently mere trifles, and consequently I shall plead this as my excuse for bringing forward such a simple matter for discussion as the making and application of linseed poultices. The first point to be considered is the kind of linseed which is best suited for the purpose. There are two kinds in common use: (1) the crushed, or oily linseed, (2) the ground linseed, or pulv. lini. of the Pharmacopœia, from which the oil has been extracted.

The *first* is that which is most commonly used, but it does not retain heat so long as the other, nor is it so easy to remove from the surface of the skin unless it is covered with flannel, cambric, or muslin.

The *second* takes up a much larger quantity of water than the other, and retains its heat much longer. The Pharmacopœia orders oil to be mixed with it, but this I consider a work of supererogation, inasmuch as the oil has no particular virtue, and it cannot produce any better or quicker effect on the surface of the skin than the simple heat and moisture. The linseed should be thoroughly stirred with a spoon while the boiling water is being gradually added, and when it has been made pretty soft as regards consistence it should be spread on linen which has been previously torn or cut to the required size. If the back of the hand will stand the heat of the poultice, it may be safely put on to other parts of the body. It should be applied directly[1] to the skin without any material intervening, and covered on the outside with oiled silk (the French will be found the best, as it does not crinkle). If poultices are being applied to the chest, the back and front pieces of linen should be pinned or sewn together over the shoulders and kept close to the body by means of a handkerchief (medicated cotton wool should take the place of the poultices for a little time after they have been dispensed with).

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[1] [For our own views on this subject vide *Practitioner*, Oct. 1882.—Ed. Pract.]

Medicated poultices are sometimes particularly useful, and especially in cases of abdominal pain. The linseed may be mixed up with the boiling liquor derived from poppy-heads and chamomiles instead of water, or a teaspoonful of laudanum may be sprinkled over the surface of the poultice when made.

Where there is intense, far-extending inflammation of the skin, a little sulphate of zinc and alum (three grains of each to the ounce of water) mixed up with the poultice, will sometimes produce a very satisfactory effect in limiting the area of the mischief, and producing a more healthy appearance of the skin affected. In the case of unhealthy sloughing wounds, carbolic acid lotion (1 in 40) may be mixed with the linseed, and will be found to effect a very satisfactory change.

The question is frequently asked "How often will it be necessary to change the poultices?" Of course this to a certain extent depends on circumstances and the nature of the case. In chest cases it is absolutely necessary the poultices should be hot and moist, and consequently it is as well to order them to be changed every four hours, though they will often keep hot for a very much longer time—say from six to eight hours.

The front and back of the chest should not be exposed at the same time while the changing of poultices is going on, and the old poultices should not be removed before the fresh ones are ready. In cases of abdominal pain the frequent changing and the consequent increased warmth seem to be grateful.

There are doubtless numerous other little points with regard to the subject of poultices which might be discussed with advantage, but those that have been put forward are the result of personal experience, inasmuch as I have made such poultices myself, applied them, and carefully noted results. It is to be hoped, therefore, that the directions herein given will be found to be generally useful and trustworthy.

Reviews.

Diseases of the Spinal Cord. By Byrom Bramwell, M.D., F.R.C.P., Edin. 8vo, pp. 300. Edinburgh: Maclachlan and Stewart. 1882.

Clinical Lectures on Diseases of the Nervous System. By Thomas Buzzard, M.D., London. 8vo, pp. 466. London: J. and A. Churchill. 1882.

The progress of the analysis of many of the nervous diseases which a generation ago were passed by in a few sweeping sentences has been one of the most marked additions to the clinical knowledge of our time, and justly affords some ground for triumph. At the same time it has been apt to engender some dogmatism in the happy owners of the fresh knowledge, and some tendency to over-estimate its completeness. Those who can best by wide experience temper the dogmatism and restrain the over-estimate are the truest leaders. In both the books before us there is much that is excellent teaching of common knowledge, with a touch of dogmatism, perhaps, in Dr. Bramwell's book, almost inseparable from a text-book, but with little raising of expectations beyond what a careful clinical study may satisfy; and, in Dr. Buzzard's more especially, many hints on the connection of symptoms and explanations of their meaning which are not only useful but original.

Dr. Bramwell deserves our thanks for having taken up the difficult task of writing a text-book on a subject which is already extensive and intricate, and which is rapidly growing in intricacy and extent, so as to be almost beyond the limits of the text-books of general medicine, and to require separate treatment, which it is only just beginning to receive in England. The prolegomena are the most important part of the book, and of them more especially the long chapter—occupying nearly a third of the whole work—which treats of the method of examination in cases of diseases of the spinal cord. A complete table is furnished of the more important points in the history of the case as to which information should be asked, as well as of the points in the present condition of the case to be tested. As to the method of testing, the description is clear, accurate, and complete; no over-confident reliance on one class of evidence is shown, and there is no disdain of some practical working precautions. "See that the battery is in working order" (p. 89), is a warning which implies some knowledge of common electrical practice. When, however, he says "the bodies of the vertebræ should be palpated from the front: pain sometimes is elicited and swelling occasionally perceived by this method when the examination of the spinal column from behind reveals no abnormal condition" (p. 146), we trust his readers may realise the very small minority of cases of disease in which, though pain be "elicited and swelling occasionally perceived," such examination is more profitable than dangerous. The accounts given of the various diseases of the spinal cord are well-compressed epitomes, intelligible enough, and with some good illustrations, chiefly from Duchenne, Charcot, and Gowers; useful for reference, but rather hard to remember or render life-like without more picturesqueness of language than is easily to be attained. As to the distribution of the diseases, Dr. Bramwell quotes some careful observations showing that in three cases at least they fall almost entirely on the male sex; viz. in locomotor ataxy in 85 per cent., in progressive muscular atrophy in 81 per cent., and in pseudo-hypertrophic paralysis in 88 per cent., but he does not seem more confident of any complete explanation than many others who have noticed the point. The careful tabulation of the points of diagnosis of the various diseases is well carried out, and is a short cut to some knowledge; the pathological illustrations in colour are brilliant and will excite many, we may hope, to rivalry. Sometimes, as in a case of pseudo-hypertrophic paralysis, which the author examined post-mortem they rather overpower the text. There are rather more misprints than we should have expected in a book on the whole so well got up—*e.g.* quotinian (p. 157), oleranon (p. 193), musculo-spinal (p. 274), $60\frac{4}{5}° - 53\frac{3}{5}°$ for $60\frac{4}{5}° - 68°$ (p. 253), etc. Pathognomic (p. 191) we trust is nothing worse than a misprint; "Sawyer's jacket" (p. 271)—for Sayre's—is unfortunate.

There is an exceedingly useful paragraph (§ 126) on hysterical paraplegia, which suggests some most important distinctions between organic and functional disease: "Local muscular atrophy, the reaction of degeneration, some spinal incoordinations, the paralysis of the sphincters—are proof positive of organic disease; but the great majority of spinal symptoms occur both in organic and functional disease" (p. 152). "There is nothing distinctive in the condition of a paralysed muscle in cases of hysterical paralysis. In some the loss of motion is incomplete, in some all motor power is abolished. The paralysed muscles are sometimes flaccid, in other cases they are rigid, the reflexes are exaggerated, the ankle clonus is present, and the condition exactly resembles the spastic paraplegia which results from organic disease." The difficulty of diagnosis here practically admitted receives further illustration from Dr. Buzzard's lecture, On Hysterical Simulation of Myelitis, (Lecture V.), and careful consideration is necessary here, where a mistake is especially ruinous; for "you cannot cure a case of hysteria," says Dr. Buzzard, "so long as you have any doubts as to its nature." The organic diseases which have a more or less analogous representative in hysterical states are (1) spastic spinal paralysis from sclerosis of the lateral columns of the cord, (2) acute anterior poliomyelitis, (3) diffuse subacute myelitis of the dorso-lumbar region, and (4) disseminated cerebro-spinal sclerosis. Of the hysterical analogues of the first three of these Dr. Buzzard gives very graphic cases well worth attention. On the discussion of the last, the most difficult of all to discriminate, he unfortunately does not enter. But it is noteworthy how many involuntary symptoms he, in common with Dr. Bramwell, admits as arising from states essentially hysterical, viz. ankle clonus, exaggerated deep reflexes, spastic rigidity, atrophy of one limb, and loss of plantar sensation, or at least of plantar reflex. If it is shown that these may be present, and may be dispelled in a few hours, it must lead to a confession that we do not as yet completely understand the conditions of their occurrence, and must not trust to them as certain diagnostic signs of pathological changes.

To do justice to Dr. Buzzard's "Lectures" in detail would require more space than is at our disposal. They are a collection of essays and lectures written or delivered during the last six or seven years, on kindred subjects, full of experience and suggestion, and of considerable graphic power. There are many cases given at length (and for many details he expresses himself as indebted to his House Physicians at the National Hospital in Queen's Square, Dr. Broster and Dr. Beevor), but all have point, and most have sufficient incident and local colouring to be easy to remember. He makes no profession to treat all spinal diseases completely, and so escapes one of the special difficulties of a text-book. Progressive muscular atrophy, pseudo-hypertrophic paralysis, disseminated cerebro-spinal sclerosis and other less important groups are entirely passed by. But the description of tabes dorsalis (pp. 120-281) is on the whole the best we have in English, and it is by no means an easy disease to describe. Dr. Buzzard has added some new touches to the picture, as drawn by Charcot, Grasset and Erb. The phenomenon of the Argyll-Robertson pupil (contraction on accommodation but not to light) he very aptly suggests is comparable to the retention of voluntary power in the legs with loss of the involuntary reflex (a suggestion which Erb has since taken up).

The bilateral facial neuralgia which sometimes accompanies tabes may be explained by a similar but more precise analogy, for, inasmuch as the descending root of the trigeminus is the analogue of the posterior roots in the lower spinal nerves, the pain in the region of the fifth nerve (which, it should be remarked, is "flying," and does not map out accurately the district of one or other division of the fifth), is the analogue of the lightning pains in the limbs and is due to some sclerotic atrophy in the medulla. A third point which we owe originally to Dr. Buzzard is worth mention. The condition of ophthalmoplegia externa had attention called to it in England by a very able essay of Mr. Jonathan Hutchinson; and, though never common, it is found far more often in tabes than can be the result of chance coincidence. It was Dr. Buzzard's observation that the cases in which it occurs are generally cases in which the *crises gastriques* appear also; and he draws the inference that both depend on sclerotic changes in contiguous districts about the origin of the vagus and its immediate neighbourhood whence spring the oculo-motor nerves. And further, the *crises gastriques* are particularly frequent in those cases in which there is tabetic joint-disease (at least in forty-eight cases of recorded joint-disease there are twenty-four with *crises gastriques*), so that Dr. Buzzard is led to assume in the medulla a centre in the neighbourhood of the origin of the vagus which is concerned with the nutrition of bones and the tissues of the joints. Such a hypothesis is put forward with due deference to an ultimate appeal to pathological facts that are difficult to observe, and is indeed a suggestion of "a new direction in which pathological anatomy might turn its inquiries" (p. 246). These curious interweavings of functionally distinct parts of the nervous system, as shown by disease, give a practical reality to much in minute anatomy that seemed vain labour, and in physiology fruitless theory and objectless experiment. It is remarkable, too, how a disease once thought so simple as tabes dorsalis, especially as it was painted by the French school, widens on careful investigation until, though we may still with rough accuracy call it locomotor ataxy, it has grown to include some cases which are not ataxic and others where the injury is not dorsal.

The later essays diverge into many interesting bye-paths where we cannot follow them. That "On Cases of Tetany" brings forward again Dr. Hughling Jackson's bold hypothesis that they are cases where the continuous cerebral influence on the muscles is for the time suspended and the cerebellar influence left intact; the capacity for voluntary or changing movements is lost, and that for automatic or continuous is predominant. Lecture XXV., "On some points in the Diagnosis of Lead Poisoning," shows how the electrical reactions so often despised may be of immediate and unique value in picking out a healthy supinator brevis in the midst of degenerate extensors of the arm, showing thereby the origin of the paralysis to be lead poisoning.

On many more points than we can touch on here these lectures are worth attention: they are well digested experiences and inferences in a field where considerable knowledge is necessary before experiences are of any value, and considerable thought before inferences are worthy of consideration.

Outlines of the Science and Practice of Medicine. By WILLIAM AITKEN, M.D., F.R.S., Professor of Pathology in the Army Medical School, &c. Second Edition. London: Griffin. 1882.

WE welcome a new edition of Dr. Aitken's concise and elegant guide-book. Its clear arrangement and great fulness of matter have made it an established favourite with students. On glancing over the well-packed pages, through all of which runs a thread of luminous scientific classification, we are reminded of the French saying, that only a master-hand can write a good primer. These outlines are not empty or bare outlines; they inclose very much that is solid, practical, and essential. The edition before us has been well revised. It now corresponds with the author's well-known larger treatise, of which the seventh edition, recently published, showed abundant signs of his careful observation and criticism of recent progress in medicine. We know of no handier book of reference which we could advise the junior practitioner or medical officer abroad to carry with him on his travels.

Saint Thomas's Hospital Reports. New Series. Vol. xi. Edited by Dr. ROBERT CORY and Mr. FRANCIS MASON. London: Churchill. 1882.

IN addition to several interesting papers of clinical interest, this volume contains one on the use of the continued current in diabetes by Drs. Stone and Kilner. The original suggestion appears to date from 1861, and to be due to M. Semmola. He based it upon certain theoretical conclusions of his own, which led him to believe that in some neuropathic cases the continuous stimulation of the vagus would diminish the production of sugar. Two cases were treated by the constant current at St. Thomas's.

The electrodes were placed on the nape of the neck and the forehead: the strongest current used was 10,000 micro-webers (Ampères), the usual one 2,000. The first patient's excretion of urine fell in the course of two months from about 150 oz. daily (sp. gr. 1040) to about 70 oz. (sp. gr. 1038). Presently it rose again in spite of continued galvanisation, and the man ultimately died. Slight traces of hæmorrhage into the pons were found. The other case seemed to be benefited, but the report is incomplete.

We note a painstaking monograph by Mr. Anderson on congenital hypertrophy, and another on measurement in the medical application of electricity by the authors cited above. Medical electricity is just emerging from the qualitative stage into the quantitative. We may hope that the new evolution will bring with it more lucidity, and less of the vague empiricism that have hitherto damaged the cause of electro-therapeutics. Work like Dr. Stone's, though it may seem "unpractical," as the phrase is, to many, is quite surely a high service to practical medicine.

A Manual of Obstetrics. By A. F. A. King, M.D. London: H. Kimpton. 1882.

This summary of recent text-books on midwifery will be of most value to practitioners who wish to refresh their memory on points of theory or practice. The descriptions are short, concise and accurate, and will be quite intelligible to the student who has worked carefully through his text-book; but they can hardly be of so much service to "the student at the commencement of his obstetric studies," as the author seems to think. The manual represents, in fact, a set of systematic notes such as a wise student would make for himself in preparing for an examination. Such notes have much less educational value when the student finds them ready-made.

Clinic of the Month.

Spasm of the Glottis treated by Nitrite of Amyl.—Dr. Joseph Williams, of Boston, U.S.A., writes:—"I was sent for in haste to see an infant of nine months, which was thought to be suffocating. I found that the child had slept naturally, but about 6.30 A.M. had had a very slight spasm of the arms and legs, and at once began to breathe heavily, and became unconscious in about ten minutes: there was no cough at any time. At 7 A.M. the hands and wrists, feet and ankles, were cold and purplish; lips livid; breathing very laboured, sixteen per minute; expiration much prolonged; sinking of whole chest-wall at each inspiration; pulse thready, and child quite unconscious. The use of cold having no effect in reviving the child, I sent one messenger for nitrite of amyl and another for assistance, with a view to possible tracheotomy. I caused the child to inhale the contents of two 5-minim pearls of the nitrite so gradually as to cause only slight flushing of face; almost immediately the stridor ceased, the breathing improved, the surface became warmer, pulse more distinct, and in perhaps two minutes the child was in a deep sleep, which lasted about twenty minutes. A hot bath, linseed poultice to abdomen, and internally potass. bromid. 2½ grs. every two hours, completed the treatment. Child was as well as usual next day. I report this case simply to bear testimony to the value of nitrite of amyl in an urgent case, and also because I am not aware of its having been used in this affection." (*Canada Med. and Surg. Jour.* Sept. 1882.)

Iodoform in Purulent Ophthalmia.—Dr. Dujardin reports the case of a child, eight months old, who had been suffering for five days from purulent ophthalmia. Both corneas were greyish throughout, and on the point of ulceration. The eyelids were constantly closed, and presented a truly enormous erysipelatous swelling; pus escaped in abundance, unmixed with tears. The general condition was bad; face pale; complete loss of sleep and appetite.

At first, according to routine practice, a two per cent. solution of nitrate of silver, neutralised with salt-solution, was applied, and the eyes were then washed freely with pure water. The result was not good; the everted eyelids presented whitish eschars, produced by the cauterisation; both corneas showed well-defined opacities, probably caused by the injurious action of the nitrate of silver; the conjunctival suppuration remained quite as abundant as before, and the swelling of the lids underwent no change in spite of the use of iced-water compresses. Under these circumstances a successful issue was almost despaired of, but he resolved to try the insufflation of iodoform so strongly recommended by German oculists, and dusted the powder all over the conjunctival surface of the lids. The following day an improvement was noticeable; the purulent discharge had decreased considerably; and the eyes began to water, which he regarded as a very favourable symptom. He continued the application of iodoform. During this time the little patient took broth and Malaga wine. The purulent secretion then entirely ceased, the tears ran freely, the corneas returned to a better state, becoming more transparent; the superficial opacities, due to the use of the nitrate of silver, gradually disappeared. Eight days from the commencement of the treatment the child was out of danger. He sent him back to his parents at Roubaix, with only a small opacity remaining in each cornea, which will, doubtless, disappear in a short time. (*Ophthalmic Review,* Sept. 1882.)

Chinolin in Diphtheria.—Dr. Seifert has obtained very good results by the use of chinolin in diphtheria. He gives a long series of detailed cases, some slight and some severe, chiefly among adults. He has only had a single death, and that in a syphilitic and rickety child of 18 months. He has given up the use of the tartrate of chinolin on account of its bad taste and smell. Instead of it he prescribes pure chinolin in a 5 per cent. solution (the menstruum is alcohol and water, *partes acquales*): this is for painting the fauces. As a gargle he prescribes—

Chinolini pur.	gramme	1
Aq. dest.	„	500
Spir. vini. rect.	„	50
Ol. menth. pip.	gtt.	2

The fauces are painted once to four times a day, according to the stress of the malady. A new brush (of hair or cotton-wool) is used each time: the old ones are at once burned. The application at once causes a burning, stinging pain, which is soon relieved by washing out the throat with cold water. A feeling of comfort succeeds, and the patient is at once eased of any difficulty in swallowing. Many patients look forward eagerly for the repetition of the operation. The antiseptic effects of the chinolin become quickly apparent. The fœtor of the breath passes away. The membranes are in many cases cast off within twenty-four hours. The swelling of the glands subsides, and the temperature sinks quickly to the normal. In severe cases the chinolin always checks the threatened onset of dangerous symptoms. No other special treatment was used by Dr. Seifert: in a few cases an ice-bag was applied to the front of the neck. (*Berl. klin. Woch.* 22-24, 1882.)

Hæmorrhage after Excision of the Tonsil.—The removal of a hypertrophied tonsil is a frequent and simple surgical operation, in connection with which any complication is so infrequent as to be unheeded by many operators. Experience abundantly proves, however, that it is not unattended with danger from hæmorrhage, one of the most serious features of which is that it may not be primary, but intermediary, or what is usually spoken of incorrectly as "secondary." There may be only the usual slight amount of hæmorrhage at the time, and then some hours later a profuse flow of blood occurs. This fact it is which gives additional import to the complication. Dr. Lefferts, of New York, has recently drawn attention to this subject, and has recorded cases in which the bleeding has been profuse, and discussed the appropriate treatment. In this country, we believe it is not an infrequent plan to give every patient an astringent powder to be moistened with water and introduced into the back of the throat should bleeding come on. Dr. Weir has recently recorded a case of this intermediary hæmorrhage, which illustrates well one cause of it, and the explanation of its mode of occurrence. One tonsil of a young man was removed with a guillotine; there was slight hæmorrhage at the time, but several hours afterwards, severe loss of blood—estimated at a pint—ensued, which was controlled by the application of persulphate of iron and by pressure; the bleeding recurred twice subsequently. When Dr. Weir saw the patient he found that the bleeding vessel was an artery in the anterior pillar of the fauces. The vessels of the tonsils are small and lie in soft tissue, which readily permits of their natural closure when severed, and the various movements of the throat do not of themselves disturb the wounded vessels. Not so is it with the palatine arteries; they are, in the first place, larger, and, as they lie in the muscular tissue of the palate, when wounded they are constantly exposed to disturbance from the contractions of the palate muscles in deglutition. If one of these vessels be wounded then, in the operation of excising the tonsil, not only is the hæmorrhage freer than from the tonsillar vessels, but there is a great tendency to recurrent bleeding from the constant movements to which the wounded vessel is exposed. (*Lancet*, Oct. 28, 1882.)

Hypodermic Injections of Blood in Gastric Ulcer.—Prof. Bernutz has successfully treated two patients suffering from simple gastric ulcer with subcutaneous injections of blood. They were both much reduced owing to incessant vomiting, everything swallowed being at once rejected. The blood, taken from the femoral artery of a large dog, was received in a warm vessel, and at once injected by means of a warmed Dieulafoy syringe. In the first case the blood was promptly absorbed, and sufficed to keep up the strength for two days. As the patient grew stronger the vomiting ceased, and milk diet was resumed. Gradually the appetite improved, and food of all kinds was well borne and digested. Fowl's blood was once tried, but its good effects seemed less lasting. The second case was similar, but the patient here was even farther gone through simple inanition. Here the first injection was not absorbed, and a phlegmonous inflammation started from the injection wound and spread over the arm. The gastric difficulties seemed however to decline as the inflammation of the arm advanced. The obstinate vomiting ceased, and with it the gastric pain ; so that the patient was presently able to enjoy the ordinary hospital diet. In this instance the blood could have little if any nutritive value, as it was not absorbed. Prof. Bernutz is inclined to think the severe local inflammation in the arm may have acted beneficially in some reflex way on the gastric lesion. (*Gaz. des Hôp.* 64, 1882.)

Rapid Blanching of the Hair.—A case of rapid blanching of the hair in the course of neuralgia of the head is recorded by Dr. Raymond. The patient was a woman of 38 years, with black hair, and had been in good health until she received news of the loss of a considerable sum of money. She became restless, lost appetite and sleep, and was attacked by severe pains in different parts of her body. At the time of the bad news she was menstruating, and the catamenia at once ceased. The neuralgic pains became most intense in the head, and at the time of their greatest severity the whole hair of the head, in not more than five hours, changed colour, becoming red and then in a few days white. At the end of fourteen days the patient had become almost bald, and had to wear a wig. From this time the neuralgia completely disappeared. (*Rev. de Méd.*, Sept. 1882.)

Bread Pills in Hysteria.—A case is recorded by Drs. L. Landouzy and S. Bellet of the sudden cure of hysterical contraction in a patient, by the administration of so-called *pilules fulminantes* (micæ panis). The patient was 26 years old, and had been well until she was attacked with chorea after fright at the age of 20. A second attack, which lasted five months, was caused by a fright at 24. A third attack followed vaccination on admission into the hospital a short time afterwards. This was followed by contraction of both legs, which for eight months rendered her completely helpless. She developed a craving for morphia injections, which were at last stopped, and in their place *pilules fulminantes* (simple pilulæ micæ panis) prescribed. The patient, having been warned of the violence of the remedy, took, with suicidal intent, four times the prescribed dose, and presently exclaimed, *Je sens encore les entrailles qui me bouillent, mais voyez mes jambes!* The patient left the hospital cured three weeks later. (*Ibid.*)

Tubercle in Bone.—Mr. Savory makes the following suggestive remarks on the clinical characters of tubercle in bone:—It is curious on reflection to see how many striking points of analogy there are between the progress and effects of tubercle in lung and in bone. In the first place the cancellous texture of bone, which is the seat of tubercle, resembles broadly in physical characters the parenchyma of lung. A section of cancellous bone and a section of dried lung have to the naked eye a very fair general resemblance. The structure of both is aptly described as sponge-like, and this resemblance is drawn more closely when a mass of yellow tubercle occupies the substance of each. In both cases the spongy texture appears to be filled up and rendered solid by the infiltration of the caseous deposit. Then, too, the resemblance further appears in the halo of inflammation or increased vascularity of varying width which so often surrounds the mass. Still further is the likeness shown in the mode in which the tubercle degenerates. The included tissue is broken down and destroyed until, either by the escape or disappearance of the tubercle, a cavity is left in the cancellous bone corresponding very remarkably to a vomica in the lung. Furthermore, the likeness is extended by the relation of cancellous bone to a neighbouring joint and the relation of lung substance to the pleura. Just as pleurisy is so often set up by the disturbance of tubercle in the lung, so synovitis is often provoked by the disturbance of tubercle in adjacent bone; and just as empyema is sometimes produced by the perforation of the lung-wall and the escape of matter into the pleural cavity, so suppuration in a joint, which is too often destructive, is due to the perforation of the articular wall of bone and the escape of matter into the synovial cavity. In either case urgent symptoms are apt to supervene suddenly on comparatively latent mischief. Then, I think, the variable progress and effect of tubercle in the lung are oftentimes repeated with singular resemblance in bone. The first struck me many years ago in studying the graphic picture which Dr. Latham drew of the various forms of phthisis in his masterly Lectures on Clinical Medicine, which, by the way, have been happily reproduced by the Sydenham Society under the editorship of Dr. Martin. Just as in lung, so in bone; the history of tubercle is sometimes that of a single formation, which passes steadily, with more or less rapidity, to destruction; sometimes that of several smaller ones simultaneously; sometimes, though this more rarely, that of a number of successive formations, which pass through their stages one after another, leading in this way to a gradually extending destruction of osseous tissue. So, again, and in this I think the resemblance is most marked of all, there are in tubercle in bone phenomena very exactly corresponding to what Dr. Latham in the lung, and in the cervical glands as a more obvious illustration, has described as cases of mixed and unmixed phthisis. In one class, during the changes which tubercle, after its formation, is prone to undergo, there is only what may be called a necessary amount of inflammation excited in the surrounding texture, such as is just sufficient to accomplish the result of softening and expulsion, and which subsides as soon as that is effected. This Dr. Latham called the specific limit of the disease. In another class the inflammation provoked spreads widely and deeply beyond this, and becomes much more severe and extensive than is needful for the mere elimination of the tuberculous matter. In short, Dr. Latham's sketch might have been drawn from a study of tubercle in the head of the femur or tibia or in the tarsus or vertebræ. (*Lancet*, Nov. 4, 1882).

A New Symptom in Cerebral Disease.—"In certain morbid conditions," says M. Parrot, "if one pinches the skin smartly, the pupil will be seen to dilate." After detailing two series of cases (in one set of which this symptom was present and in the other absent), he considers the mode of production of the symptom, and he arrives at the opinion that it is not the result of contraction of the radiating fibres through the influence of the sympathetic nerve,—this would, in his opinion, be insufficient to overcome the antagonism of the constricting or circular fibres,—but that it results from vascular depletion of the iris owing to constriction of its vessels. In support of this view he reminds us of an observation of Kussmaul's, that the pupil dilates during inspiration and contracts during expiration. According to Parrot the following would be the order of events: irritation of the skin by the pinch, transfer of this irritation to the medullary centre by the sensory nerves, its reflexion thence to the vaso-constrictors of the iris, depletion of its vessels, dilation of the pupil. An essential factor in the production of this symptom would be the retention of cutaneous sensibility. In the second series of cases, where this symptom was not present, cutaneous sensibility was nearly, if not quite, lost. He arrives at the following conclusions:—In certain affections of early infancy, with or without convulsions, with or without appreciable lesions of brain, the patient being in a state of persistent coma, if one pinches the skin, a momentary dilatation of the pupil to even two or three times its previous size is produced. Of these affections, those which are characterised by obvious lesion of the nerve-centres are tubercular meningitis, hæmorrhage into the pia mater, certain cases of chronic hydrocephalus, and, lastly, certain ill-defined conditions in which the volume of the brain encroaches upon the cranial capacity. On the other hand, in other morbid states, mostly without convulsions but with coma, the pupil much contracted undergoes no change even when one pinches the skin with sufficient force to produce movement of the face and limbs. In these patients sometimes there exists no appreciable lesion of the nerve centres; at other times there may be œdema or marked congestion; but in neither case is there any cerebral compression. So far, the only practical conclusion one can draw from this group of facts is the following: a child (affected or not with convulsions) who is comatose, and whose pupils do not dilate when the skin is pinched, is not suffering from meningitis or hæmorrhage into the pia mater, but death is imminent.—(*Revue de Médicine* and *Med. Times and Gaz.* Oct. 1882).

Psoriasis following Vaccination.—Dr. Rohé related at the sixth annual meeting of the American Dermatological Association the histories of two cases in which acute general psoriasis followed vaccination. One of the patients was a man aged 28, and the other was a boy aged 9 years. Bovine virus had been used. (*Journal of Cutaneous and Venereal Diseases,* Vol. I. No. 1.)

Echinococcus and Urticaria.—It has been frequently observed that exploratory punctures of hydatid cysts have been followed by an eruption of urticaria. A case of this kind is published by Dr. Weiss in the *Berlin klin. Wochenschrift.* Two hours after a cyst in the epigastric region was punctured the whole surface of the body became covered with urticaria accompanied by high fever. The eruption disappeared in about two hours. (*Annales de Dermatologie,* Vol. III. Nos. 9 and 10, 1882.)

Treatment of Alopecia Areata.—Dr. Thin reports on an unbroken series of fifteen cases of alopecia areata treated by the application of sulphur ointment. The author recommends that the hair should be kept shaved or cut close for some distance round the area, and that the bald surface and the cut or shaven margin be constantly covered with the ointment, which should be freely applied. The part is not to be frequently washed. (*Brit. Med. Journal*, Oct. 21 and 28, 1882.)

New Source of Mercurial Poisoning.—Two cases having recently come under our notice in hospital practice of mercurialism in men employed in exhausting the little globes used in the incandescent system of electric lighting, we think a brief notice of the fact will be interesting, and may, perhaps, call forth more information from others. In each instance the gums were swollen, spongy, and tender, and there was salivation. The patients were employed in the same room, and both knew that mercury was the cause of their ailment. So far as we could gather from their account the poisoning must have been due to mercurial vapour from the exhausting pumps, as no mercury was used except that contained in these pumps. From the statement of one of the patients we should infer that all those employed in the room would suffer from these symptoms, and have to give up the work in less than a year. (*Med. Times and Gazette*, Oct. 7, 1882.)

Transplantation of Muscle.—Dr. Helferich of Munich, after the removal of a large fibro-sarcoma from the biceps muscle of a woman, aged thirty-six, refilled the gap with a freshly-cut piece of muscle taken from a dog, fastening the same with six lower and thirty upper catgut ligatures. A cure followed anti-septic treatment. The patient can now readily flex and extend the arm. An electrical examination made by Ziemssen did not show any abnormality of contraction, and it appears, therefore, that the transplanted muscle has retained its vital functions. Lange and Gluck have reported similar experiments more or less successful. (*Berl. klin. Wochenschrift*, No. 26, 1882.)

Pilocarpin in Pleurisy.—A case occurred recently in Prof. Peter's service at the Paris Charité, which exhibits the efficacy of pilocarpin in certain cases of pleurisy. A man, thirty years of age, came to the hospital with pleurisy which had existed about a fortnight, producing an effusion which filled the right pleura. A puncture gave issue to 1200 grammes of a sero-fibrinous liquid, about a litre, as was calculated, being left in the pleura. For its absorption three blisters were applied without any effect, and a solution of two centigrammes of the nitrate of pilocarpin was therefore hypodermically injected. Some minutes after a very profuse sweat broke out, which continued for an hour and a quarter, a salivation abundant enough to completely fill two spitting-pots going on during this time. The pleurisy at once disappeared, no physical sign of the presence of the liquid remaining. Thus what three blisters could not do before, pilocarpin effected in an hour and a quarter. But this was under the most favourable circumstances, since it was only the passive remnant of a pleurisy, quite unaccompanied by any inflammatory action. (*Gazette des Hôp.*, No. 79, 1882)

Albuminuria in Phthisis.—In a certain proportion of the cases of phthisis (about 6 per cent.) albuminuria appears as a complication. Its importance varies with the condition of the kidneys. In the simplest form it is a mere temporary congestion; but a congestion due to blocking of the pulmonary vessels may after a time set up permanent changes in the renal structures. When permanent from the onset of the symptoms, it may be a dyscrasic malady, due to tuberculosis of the kidney; or it may be produced bv amyloid degeneration, which is a frequent complication of the suppurating processes of tuberculosis, the kidney being one of the organs attacked. It is a fact of much interest, that when albuminuria occurs, the febrile process and the sweating cease, and thus an illusive appearance of improvement is induced. A subnormal temperature has been observed in some cases. When therefore in phthisis the usual daily febrile movement does not come on, the urine should be examined. It need hardly be observed that the prognosis will be distinctly affected by the discovery of a permanent albuminuria. When the quantity of albumen is large, and the temperature even slightly abnormal, a rapid decline in strength and an early termination may be expected. (*Philadelphia Med. News*, Sept. 30, 1882.)

Hæmorrhage into the Sub-Arachnoid Space.—Mr. Henry Morris, after discussing, in a clinical lecture, an interesting case in which sub-arachnoid hæmorrhage was found post-mortem (the patient being a drunkard suffering from a simple scalp-wound) comes to the following conclusions:—(1) That spontaneous effusions into the sub-arachnoid space—*i.e.* effusions of blood from disease or excitement—are very often not distinguishable from traumatic effusions. (2) That post-mortem examination does not always explain the cause or the source of the effusion, and that the state of the blood-clot is only a very rough test as to the age of the effusion. (3) Extravasation of blood between the dura mater and bone, as also extravasations beneath the pia mater, accompanied by brain-bruising, are almost certainly traumatic, whether fracture co-exists or not. Extravasations into the substance of the brain and into the ventricles are almost certainly spontaneous when no fracture and no brain-bruising exists, and are probably so even when fracture without bruising of the cerebral surface is found. (4) Spontaneous effusions may occur without there being any naked-eye evidence of disease of the cerebral or meningeal vessels. (5) Spontaneous effusions into the sub-arachnoid space from disease or excitement have occurred as early as the twelfth year of life, and at all ages subsequent to puberty. Sub-arachnoid hæmorrhage occurs at any age from violence. (6) In slight injuries to the head, such as small scalp wounds without fracture of the skull, or bruising of the surface of the brain, the surgeon should be extremely cautious in attributing sub-arachnoid extravasation to a blow, and more especially when, as in the above case, the injured person is of intemperate habits. (*Lancet*, Nov. 11, 1882.)

Cardiac form of Typhoid Fever.—Professor Bernheim, of Nancy, read a paper before the French Association on this subject. He distinguishes between the cardiac form proper, as he calls it, and those other forms of typhoid in which the symptoms of cardiac disease are simulated, or in which disturbances of the pulmonary circulation are manifested. His cardiac form is marked by an acceleration of the heart's rhythm, without any organic lesion. The increased frequency of the pulse is not accompanied by any proportionate elevation of temperature. The symptoms appear at the beginning of the attack, and are due to a toxic action of the typhoid poison on the motor centres of the heart itself. It is a rare form. Bernheim has only met with six instances among 250 cases. On the other hand, it is a very grave form. No advantage is obtained by administering stimulants like alcohol and ether, and the use of digitalis is dangerous. (*Lyon méd.*, Oct. 8, 1882.)

Extracts from British and Foreign Journals.

Artificial Carlsbad Salt.—Dr. Harnack, of Strasburg, who assigns no therapeutic value to any constituent of the natural salt except the sodium chloride, sulphate, and bicarbonate, has found the salt to have the following composition:—Sodium bicarbonate, 36·19 parts; sodium chloride, 17·28 parts; sodium sulphate, 46·09 parts. He therefore recommends the following formula for the artificial salt: Sodium sulphate, 100 parts; sodium bicarbonate, 80 parts; sodium chloride, 40 parts. (*New Remedies*, Aug. 1882.)

Sulphate of Atropia in the Treatment of Coryza.—According to Dr. Gentilhomme, sulphate of atropia (from a quarter of a milligramme to one milligramme, given as a pill) [say ♏ss. to ♏ij. of the *liquor*] has an immediate effect in the first stages of coryza, often arresting the progress of the disease. It also produces great relief when the coryza is confirmed, but its action is less remarkable than at the beginning of the inflammation. When bronchitis exists at the same time, the sulphate produces an equally favourable effect upon the bronchial mucous membrane. The employment of sulphate of atropia is based upon the fact that it has the power of lessening the nasal mucous secretion to the extent of complete arrest; and at the same time it acts beneficially upon the vessels by relieving their congestion. (*Rev. méd. française et étrangère*, July 2, 1882.)

Syphilis and Alcohol.—In a recent memoir published in *La France Médicale*, M. Barthélemy calls attention to the exceptional gravity of syphilitic skin-eruptions in patients addicted to the habitual use or abuse of intoxicating liquors. The observations which he gives were all collected while the author was *chef de clinique* in Fournier's service, and relate exclusively to the waiter-girls employed in "brasseries," who receive the name of "inviteuses," because it is their business to have as much liquor ordered as possible. In the pursuit of this trade, they are obliged to drink large quantities of intoxicating liquors; one of them absorbed in one day forty-two glasses of beer, five liqueurs, and one "grog Americain;" this, of course, was an exceptional case; but most are continually drinking, in order to incite customers to order for them. When these girls contract syphilis, every symptom, even the primary chancre, is of gravity. In one case the eruption did not disappear from the cutaneous and mucous surfaces for ten years. The chancre in one case spread and became as large as a crown piece, and was surrounded with an extremely indurated border, and notwithstanding treatment, the chancre lasted three months. In another case the chancres were still present when a generalised papulo-hypertrophic eruption appeared over the whole body. It was remarked also that secondary and tertiary eruptions appeared much more rapidly, were of greater intensity, and of longer duration. (*Med. and Surg. Reporter,* Sept. 2, 1882.)

The Pathology of Cardiac Hæmic Murmurs.—Dr. Balfour, in a paper on this subject, arrives at the conclusion that the earliest cardiac sign in chlorosis is an accentuated pulmonary second sound, soon followed by a systolic murmur at the second left interspace, from one to two inches from the sternum, and here in most cases some pulsation may be felt. This is what he considers the primary chlorotic murmur. He points out that this murmur has long been recognised as produced in the appendix of the left auricle in cases of dilatation from mitral constriction, and he accepts Naunyn's explanation of the sign, viz. "That the fluid veins formed at the mitral orifice impinge upon the tense auricular wall, and throw it into sonorous vibrations, which are conveyed to the chest-wall by the appendix of the left auricle, which lies in contact with it at the base of the heart." He considers that the same explanation would hold good for the primary hæmic murmur for the following reasons:—1, In chlorosis the heart is dilated and hypertrophied, and the primary murmurs are certainly not arterial in character. 2, The position of the maximum intensity of the primary hæmic murmur and of Naunyn's murmur is precisely the same; and 3, The graphic record of the pulsation in both classes of cases is similar. "My argument," he says in his concluding paragraph, "is that the cardiac murmurs of chlorosis are formed in a dilated and hypertrophied heart, and that the primary position of the murmur is in by far the larger proportion of cases, if not in all, to be found over the left auricular appendix, where it comes up from behind just to the left of the pulmonary artery. . . . I now leave this theory with my professional brethren, assured that, if not now, at least ere long it will be universally adopted." (*Edinburgh Medical Journal,* Oct. 1882, and *Med. Times and Gaz.*)

The Results of Nerve-Stretching.—Dr. Ceccherelli provides a useful catalogue of 119 books and essays which treat of nerve-stretching, with a summary of the history and results of the operation. The origin of the operation he traces to Billroth's treatment of a man who had bruised his right buttock severely and suffered from pain and formication in the right leg, with spasms starting from the leg, extending all over the body and endangering his life from arrest of respiration. Billroth exposed the right sciatic nerve and examined it carefully up to the sciatic notch, without finding any obvious injury, or imagining that he had done any good. The man, however, got well, and the conclusion was drawn that the manipulation of the nerve had effected his cure. Nussbaum took up the idea and made an experiment in 1872 on a man who had an abscess in the neck, which left his arm contracted and anæsthetic on its anterior surface. He laid bare the brachial plexus, and, though he found no abnormality, stretched all the component nerves strongly one by one. Some violent spasms followed, but the contracture disappeared and the sensibility returned. Since then, remarks Dr. Ceccherelli, nerve-stretching has become a part of practical surgery. Experiments show the great elasticity of nerves and their great strength. The larger trunks may be lengthened about 5 per cent., but they slowly shrink again to almost exactly their original measurement. The sciatic in the dead body requires a weight of about 186 lbs. to break it [a force equal to the full strength of the grasp of a very strong hand; or, in other words, the sciatic is sufficiently strong to support a man of 13 st. weight]. Anatomically, violent stretching produces ecchymoses under the perineurium, and separation of the axis-cylinders from the neurilemma. Physiologically, it is somewhat doubtful whether the results are due to an alteration in the central or the peripheral end of the nerve, or in the substance of the nerve-trunk itself. There is no doubt that in a few instances the spinal cord is affected by traction on the nerves, as in a case of forcible reduction of the humerus after five weeks dislocation where the strain on the brachial plexus, which was matted together by inflammatory products, tore the substance of the cord and produced hæmorrhage there. The microscope throws little light on the more ordinary changes. An effect on the grey matter of the cord is sometimes argued from trophic changes which follow stretching, but these occur only when considerable violence is used. The usual result is temporary loss of sensation, without any effect on motion. Permanent loss of sensation and slight loss of motion may be produced by greater violence. Why the sensation should be the more readily affected is not plain. It is a convenient but quite unproven hypothesis that the sensory fibres are broken more easily than the motor. In surgical practice two methods are used: (1) Stretching of the nerve may be produced by very violent movements of a limb; *e.g.* Trombetta is recorded to have cured an old case of sciatica at once by flexing the hip to such an extent that the foot nearly touched the mouth: (2) The method far more commonly in use is to expose the nerve and stretch it with the finger or some instrument. Whether it is better to draw on its central or on its peripheral end must be considered unsettled, and the force to be used to the best advantage is a matter mainly of conjecture, though most surgeons of experience recommend more than seemed to them at first advisable.

From the large body of statistics which Dr. Ceccherelli has brought together may be constructed the following table, under his own headings:

	Total.	Successful.	Unsuccessful.	Deaths.	Improvement.	Doubtful.
Neuralgia	99	74	6	—	12	7
Contractures	14	13	—	—	1	—
Tic	7	6	1	—	—	—
Spasm from injury . .	12	10	1	—	1	—
Peripheral paralysis[1] .	34	34	—	—	—	—
Diseases of nervous centres	36	5	7	8	16	—
Epilepsy	4	1	1	—	2	—
Tetanus	45	14	—	29	—	2
Stretching of optic nerve	1	—	—	—	1	—
Total	252	157	16	37	33	9

The considerable excess in such dangerous cases as those of tetanus encourages Dr. Ceccherelli to recommend the treatment for a first trial. Under the diseases of nervous centres are entered the operations for relief in locomotor ataxy with the exception of sixteen recent cases of Langenbuch, in six of which he represents the pain as cured, and in the remainder the operation as too recent to justify any tabulation of the results. Benedikt throws a doubt on the ataxic nature of Langenbuch's cases, and it should be remarked that Langenbuch holds a theory of the pathology of locomotor ataxy which has few supporters (*cf.* Ricklin, *Gazette Med. de Paris,* July 1881), viz.: that it is generally started by cold, and is a peripheral lesion spreading centripetally along the nerve-trunks and by direct continuity into the posterior root-zones of the spinal cord. Bernhardt and Westphal take a decidedly adverse view of the operation, saying (Feb. 1882) that they have known of no case of cure or even of decided improvement in locomotor ataxy by this means. Dr. Ceccherelli himself is inclined to favour the use of the treatment in states of such hopeless and agonising character as occur sometimes in the course of locomotor ataxy. (*Lo Sperimentale*, Sept. 1882.)

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[1] In 30 cases a re-establishment of sensation in anæsthetic leprosy was produced by light traction on the nerves.

New Test for Albumen in Urine.—Dr. Roberts, of Manchester, writes as follows:—When an albuminous urine is treated with a saturated solution of common salt, not the slightest reaction takes place; but if the urine be slightly acidulated with hydrochloric acid, the albumen is thrown down as a dense white cloud. This reaction constitutes a most delicate test for albumen in the urine. The best degree of acidulation for this purpose is obtained with about 5 per cent. of the dilute hydrochloric acid of the Pharmacopœia. A little more or a little less acid makes no appreciable difference in the sensitiveness of the test. Common salt dissolves in about two and a-half times its weight of water at 60° F., and increase of temperature does not sensibly increase its solubility. The salt of commerce is always more or less dirty, and the solution requires filtration to fit it for use as a test. The salt solution should be fully saturated, otherwise the observer is apt to be led into error. In preparing the test with our common English measures the readiest plan is to mix a fluid ounce of dilute hydrochloric acid with a pint of water, and to saturate this with common salt, and filter. Dilute hydrochloric acid may be replaced by dilute sulphuric, dilute nitric, or dilute phosphoric acid. All these acids are of the same saturating strength in the British Pharmacopœia, and all of them yield with saturated salt solution an equally sensitive reagent for albumen. Even acetic acid may be used, but the delicacy of the test in that case is not quite so great as when it is prepared with one of the mineral acids. The method of applying the brine test is similar to that followed with nitric acid. A portion of the suspected urine is placed in a test-tube, the test-tube is then held very much aslant, and the salt solution is allowed to trickle along the sides of the tube to the bottom, so that it may form a distinct layer below the urine. If albumen be present, a white cloudy zone appears at the junction of the two fluids. Or the proceeding may be reversed. The salt solution may be first introduced into the test-tube, and then the urine added with the same precautions as before, so as to obtain two distinct layers, one above the other, in the test-tube. It is important to be aware that the precipitation of albumen by acidulated brine is not due to a true coagulation. In this respect the brine test differs from nitric acid and boiling. In the two latter cases the albumen is transformed into the insoluble modification, which is known as "coagulated albumen." But when albumen is thrown down from urine by acidulated brine, the precipitate is not insoluble; on the contrary, it is redissolved by free addition of water, or even by free addition of the albuminous urine itself. It is therefore essential to the efficient application of the test that the salt solution should be in excess at the point of expected reaction. This end is obviously secured in the above-described methods of testing. It may also be secured by adding to the suspected urine a volume of the salt solution at least equal to that of the urine in the test-tube. If this point be not attended to the test is unreliable. For instance, if acidulated brine be added drop by drop to an albuminous urine, and the mixture shaken up after each addition, the first few drops either occasion no turbidity whatsoever or the turbidity produced disappears on shaking. But when by successive additions the quantity of brine approaches to or surpasses the volume of urine operated on, the turbidity remains permanent. In point of delicacy the salt test stands on a par with nitric acid. The minutest trace of albumen detectable in the urine by nitric acid is also detectable with equal ease by acidulated brine. In high-coloured urines the brine test is distinctly superior. In this class of urines nitric acid produces a deepening of the tint, with, often, a disengagement of gas, which interferes with the sensitiveness of the reaction, but the brine test neither alters the tint nor causes disengagement of gas. On the other hand, I think that nitric acid gives a better idea of the quantity of albumen present by the density of the white cloud produced than does the brine test. In addition to albumen, acidulated brine precipitates peptones, which are sometimes present in urine; so that occasionally a slight cloudiness is produced by the salt solution where nitric acid and boiling (which do not precipitate peptones) produce no reaction. This distinction in the action of the brine test may hereafter lead to interesting information. In dense urines, highly charged with urates (but not containing albumen), the addition of nitric acid sometimes throws down the amorphous urates in the form of thick white clouds, and it is necessary to apply heat to distinguish with certainty the cloudiness so produced from cloudiness due to albumen. The salt test does not throw down the urates in this way. It is well known that the urines of patients who are taking large doses of resinous substances (such as the resin of copaiba), although free from albumen, yield a cloudiness with nitric acid in the cold, but if the urine be previously made hot, nitric acid produces no such reaction. This difference serves to distinguish cloudiness due to resin from cloudiness due to albumen. The brine test also produces a cloudiness in resinous urines, and the reaction occurs whether the urine be hot or cold. To avoid the fallacy thereby arising, all that is necessary is to add an excess of the urine which is being tested. If the cloudiness be due to albumen it disappears on such addition, but if it be due to resin, the cloudiness does not disappear on the addition of more urine. One of the chief advantages of the salt test is its incorrosive character. It does not stain nor burn holes in garments and carpets, nor fleck the hands with yellow spots. The use of it makes it possible to arrange a pocket-case for urine testing that shall not be a terror to the wearer. From this point of view the substitution of the salt solution for nitric acid will be a real boon to practitioners. The salt test has this additional convenience—that it enables us to test successively for albumen and sugar on one and the same sample of urine. The suspected urine is first tested for albumen with the salt solution, and then Fehling's solution, or, still better, a pellet of the solid Fehling's test sent out by Cooper is added, and heat applied. After boiling a few seconds the absence or presence of sugar is ascertained. The admixture of the brine in no way interferes with the copper reaction, in case sugar should exist in the urine.

I have carried about with me for some months past a little pocket-case (which is only a stiff-backed cigar-case) which I have found a useful and safe clinical companion. It contains a book of litmus papers; a narrow corked phial filled with acidulated brine; a test-tube charged with Cooper's pellets of the solid Fehling's test, guarded with an indiarubber stopper; and, lastly, an empty test-tube, also provided with a cork. This compact arrangement furnishes the means of ascertaining the reaction of the urine, and of testing it in the most delicate manner for albumen and sugar. The empty test-tube also serves to carry home a specimen of the urine for further and more minute examination. The "pellets" (made after a suggestion of Dr. Pavy) are sent out by W. T. Cooper, chemist, 26, Oxford-street, London. (*Lancet*, Oct. 14, 1882.)

Ferments.—M. Duclaux (*Annales Agronomiques*, vii. 255-285), finds that the living cells of the microscopic ferments in cheese secrete bodies resembling diastase, which act as chemical reagents and effect decompositions in the casein throughout the mass of the cheese. The living cells from which they originate exist only on the surface in contact with the air. These ferments are of two kinds: (1) like rennet, and (2) like the pancreatic ferment. The second quickly transforms curd in a few days, giving it the appearance and consistency of Brie and Camembert cheese, but leaving it quite insipid, the flavouring matters being formed by products of the decomposition of albumen resulting from the direct growth of the microscopic organisms. These organisms develop at the expense of the casein. The casein is changed by them in their growth into soluble albuminoids, leucin, tyrosin, ammoniacal salts of fatty acids, and ammonium carbonate. The trypsin or trypsoid substance co-exists with the rennet in the cheese micro-organisms, but in variable proportion. The effect produced in milk varies with the proportion of micro-organisms present, with the supply of air, and with the temperature. The ferments can be separated from the organisms which have produced them by adding alcohol, which precipitates the ferments. If the precipitate be added to fresh milk, the action of the diastase on the milk can be studied apart from that of the micro-organisms. (*Pharmaceutical Journal*, No. 626, p. 1054.)

Soluble Salts of Caffein.—Caffein, being sparingly soluble, can only be hypodermically injected in very small doses. At ordinary temperatures it requires ninety-three parts of water to dissolve it; it is, moreover, only faintly alkaline, and does not form stable salts with acids. Acetic, valerianic, lactic, and citric acids do not form definite salts with it; they augment its solubility in water without combining with it. Mineral acids such as hydrochloric, sulphuric, and hydrobromic acids form definite salts, easily obtainable in crystals, but they are not stable, and water decomposes them into free acid and caffein, which is precipitated if there is not sufficient water present to hold it in solution. Benzoic, cinnamic, and salicylic acids form very soluble double salts with it, and cinnamate of soda dissolves caffein in water equivalent for equivalent (107 parts of cinnamate of soda for 244 of caffein). The double salts thus obtained contains 58·9 per cent. of caffein. The benzoate of soda and caffein contains two equivalents of benzoate of soda or 288 parts, and one equivalent of caffein or 244 parts, which is equal to 48·5 per cent. of caffein. The salicylate of soda dissolves caffein most easily of all: and one equivalent or 160 parts of salicylate of soda dissolves one equivalent or 244 parts of caffein, which gives 61 per cent. of caffein in the salt. With these new salts therefore it would be quite possible to administer caffein hypodermically, as one might often wish to do in cases of Bright's disease. These double salts are readily prepared by simple solution of the salt or the caffein in water in the proportions just given. (*Pharm. Journal*, No. 632, p. 103.)

Eucalyptus Oil in Midwifery Practice.—Dr. Samuel Sloan, Obstetric Physician to the Glasgow Maternity Hospital, recommends the use of the oil of eucalyptus in midwifery practice. He has found it to possess, as an antiseptic, the following advantages: 1, It is non-poisonous. 2, In the quantity and strength required it is unirritating. 3, It does not coagulate the lochia, which, by separating the lips of the vulva, can be seen to flow out in a liquid stream. 4, Its odour is, with rare exceptions, a pleasant one. 5, It seems to act as a uterine stimulant, causing and assisting to maintain uterine contraction. Formed into a pessary of a suitable shape and size it is easily applied to the neighbourhood of the os, and retained there. To secure this, the pessary must be broad and short, must melt slowly but completely, and must contain a large percentage of the antiseptic oil. These requisites he has found the following formula to supply: Oil of eucalyptus, six drachms; white wax, four drachms; cocoa butter, four drachms; mix and divide into twelve pessaries. One of these must be applied night and morning immediately after the usual sponging, and, though the napkins are frequently changed, the odour will be quite perceptible on the one removed prior to the next sponging, twelve hours later. In cases of miscarriage, or when the lochia have diminished materially in quantity—say, six days after confinement—he has found the above strength produce irritation, and the following will then be found preferable: Oil of eucalyptus, four drachms; white wax, one hundred and sixty grains; cocoa butter, four drachms: divide this mixture into twelve pessaries, and label them No. 2. These may also be used at first night and morning, and afterwards at night only. These pessaries are made by first melting together the wax and cocoa butter in a vessel resting in hot water; the oil of eucalyptus is then mixed with this, and the fluid poured into the ordinary two-drachm pessary mould, each cavity being somewhat more than half filled. He has never been able to satisfy himself that the eucalyptus was absorbed into the system to any material extent. This is probable, however, and, in one case, seemed to be proved. This was a case of severely ruptured perinæum, which was stitched and united throughout. The pessaries had been continued for sixteen days, when an erythematous rash appeared over the whole body, disappearing immediately on the cessation of the eucalyptic treatment. Though uncertain as to the fact of a material absorption of the oil into the system, he is persuaded that the oil does not remain at the os, but freely passes into the cavity of the uterus. For it is admitted that the uterus for several days after labour is naturally in an alternate state of contraction and relaxation, and whilst during contraction it will empty itself, during relaxation again whatever is lying at the os or upper part of the vagina will be sucked into the vacuum produced. The eucalyptus will therefore find its way quite into the uterine cavity. When he said that, with rare exceptions, the odour is agreeable, he referred to a decomposition of the eucalyptus oil which sometimes takes place, giving the napkin a semi-fœtid odour. That this does not arise from a change in the lochia he has proved by simply omitting the next pessary when due; he then found that the lochia was absolutely sweet. (*Lancet*, Sept. 2, 1882.)

Treatment of Empyema.—Dr. Dabney, of Charlottesville, Va., after surveying carefully and critically the various methods which have been proposed for treating empyema, comes to the conclusions given below. They should be compared with those of Dr. Hobson in the March and April numbers of the *Practitioner* for the current year. Dr. Dabney maintains that—(1) "Medicinal" treatment, as it has been called, namely treatment without operation, occasionally gives favourable results, but is not advisable, inasmuch as cases so treated are liable to terminate in one or other of the following ways: (*a*) sudden death, (*b*) exhaustion, (*c*) suffocation, (*d*) phthisis, (*e*) septicæmia, (*f*) calcareous degeneration of the pus, (*g*) secondary pneumonia and gangrene of the lung, (*h*) peritonitis from the bursting of the empyema into the peritoneal cavity, (*i*) amyloid degeneration of the liver, kidneys, etc. (2) Aspiration has given good results in the case of children, and should be tried in them before the radical operation is resorted to. Aspiration and immediate washing out of the pleural cavity through the aspirator (Kashimura's treatment) has not been used sufficiently often for any conclusion as to its efficacy to be reached. (3) Free incision into the pleural cavity is usually necessary, and the best point for such an incision, when only one is made, is at the lowest point of the purulent collection, and directly below the angle of the scapula. Costal resection is to be avoided if possible, especially in children. (4) Continuous drainage is preferable to intermittent drainage, because (*a*) the danger of absorption is thereby lessened, (*b*) there is usually less danger of irritative fever, (*c*) the empyemic cavity is placed in a better position for healing. Continuous drainage is best effected by a drainage-tube. (5) Through drainage is only advisable in cases where the discharge is very fœtid, and where a single opening has proved insufficient. (6) The thoracic opening should not be allowed to close if more than two drachms of pus are discharged daily. (7) The danger of sudden death during thoracentesis or injection of the pleural cavity, when proper care is used, is so slight that it may practically be disregarded; but when injections are used, especial care should be taken to see that they have a free outflow. (8) Simple injections of pure water are often sufficient, but compound tincture of iodine, one part to four of water, is devoid of danger, and hastens recovery. This will usually check fœtor also; but if it does not, salicylic acid or permanganate of potash in one-half or one per cent. solutions, may be employed. Carbolic acid is dangerous, as is also boracic acid. (9) Listerism would probably be advisable in city or hospital practice, but is of doubtful efficacy in the country, and under no circumstances should it be allowed to interfere with through drainage. (*Amer. Jour. Med. Sciences*, Oct. 1882.)

Sulphur and Malaria.—The influence of sulphur compounds on organic life is familiar. It is seen only too clearly in the aspect of vegetation in many of our manufacturing districts, while the probable dependence of specific diseases on an organised contagium renders the familiar method of disinfection by sulphur another illustration of the fact. Observations on which we have lately commented afford strong reasons for believing that the active agent of malaria also consists of low organisms. It is, therefore, not surprising if sulphur emanations should be found to exert a marked influence on malaria, and some interesting facts have been lately collected by M. D'Abbadie to show that this is actually the case. In Sicily, deposits of sulphur and intermittent fevers are both common, but occur for the most part at different elevations. In some places the sulphur deposits are found at a low elevation in malarial plains. In these districts the labourers in the sulphur works enjoy an almost complete immunity from intermittent fever, not more than 8 or 9 per cent. suffering, whereas of the inhabitants of neighbouring villages not less than 90 per cent. are attacked. In some travels in Greece, published by M. Fouqué, is an account of the ruins of a large city (Zephyria) situated in a marshy plain, in which it is impossible to pass the night without being attacked by ague. Three hundred years ago, it is said, the city contained forty thousand inhabitants and thirty-eight churches. Paludal fevers gradually destroyed the population. Twenty years ago only two hundred inhabitants remained, languishing and ill. They refused to leave the place, and the last of them died during Fouqué's visit. It is certain that malaria cannot have prevailed to the same extent during the period at which the town was in its rise and full development, and it is also noteworthy that the soil beneath the town contains abundant deposits of sulphur which was formerly worked in the vicinity, and the decadence of Zephyria dates from the discontinuance of these sulphur workings. Moreover, Fouqué has noted another instance of the same relation. The marshy plain of Catania is traversed by the Simeto, and is infected by fever. On the western border of this plain are some sulphur works, at which are a number of inhabitants who suffer little, although a village not far away is deserted. In Ethiopia certain elephant hunters expose their naked bodies daily to a fumigation of sulphur in the belief that this will preserve them from malaria, and certainly they enjoy an almost complete immunity from this disease, although some of the districts are so unhealthy that not long ago a whole caravan perished. (*Lancet*, Oct. 21, 1882.)

Mango as an Antiscorbutic.—An antiscorbutic called "amchur" is being introduced among our native soldiers in India, and promises to be an excellent substitute for lime-juice, to which it is greatly preferred by the men, who have long used a similar compound as a condiment. It is made from green mangoes, which are skinned, stoned, cut into pieces, and dried in the sun. Dr. Clarke, Deputy Surgeon-General on the Eastern Frontier District, reports that amchur not only maintains the digestive energy of the men, but that its use among troops, where no variety of food and no vegetables are obtainable, commends itself strongly as a result of practical experiment to the military authorities. One ration should be half an ounce, and this would be an equivalent for an ounce of good lime-juice. (*British Med. Journal*, Sept. 30, 1882.)

The Transmission of Syphilis.—From observations made on 119 syphilitic families, Kassowitz comes to the following conclusions :—(1) A healthy woman can, without herself being infected, bear a child who inherits syphilis from its father. (2) A child may be born untainted if its parents, at the time of conception, are healthy, even if the mother should acquire syphilis during her pregnancy.

Caspany is strongly opposed to this view. Even if we hold that the syphilitic poison is located in the cellular elements, it has never been proved that they cannot enter the blood-vessels of the fœtus. Caspany has, moreover, succeeded in finding granules of vermilion in great number in the blood of the fœtus in pregnant rabbits in whose jugular vein he injected an emulsion of vermilion. He does not state as to whether this transfer occurred through the white corpuscles or not, but this mode is rendered probable from the experiments of Max Schultze.

The conditions laid down by Fournier concerning the marriage of syphilitics are generally accepted. They are these :—(1) At least three to five years must have passed from the date of infection. (2) Thorough mercurial treatment must have been employed. (3) If either or both parents are syphilitic before conception, the child may become syphilitic. (4) If both parents are sound at the time of conception, and the mother subsequently becomes syphilitic, the disease may be transferred through the placental circulation, and the child be born with congenital syphilis. (5) If the father is syphilitic before the conception, and the mother sound and not infected by the father, the syphilitic poison may reach the mother through the placental circulation from the child, and either the mother may be rendered syphilitic or her constitution may be so changed that she obtains an immunity from the disease. The last opinion is advanced with considerable reserve. (*Deutsche med. Woch.*, July 29, 1882.)

Treatment of Venereal and Common Warts.—Prof. Unna recommends for the treatment both of venereal and of ordinary warts the continuous application of unguentum hydrargyri containing 5 per cent. of arsenic. In the case of a young girl upon whose hands were a hundred or more warts, the application for three weeks of a plaster, containing in each 0·2 square metre 10 grammes of arsenic and 5 grammes of mercury, caused entire disappearance of the disease without any irritation of the healthy skin. Cure was effected not by necrotic destruction of the warts, such as occurs in the use of caustics, but by resorption, as in cases of spontaneous cure. (*Monatshefte für prakt. Derm.*, No. 3, 1882.)

Injury of the Eyeball by Corrosive Substances.—Weinberg finds that the accidents caused by mineral acids are generally more severe than those caused by metallic oxides, because they spread much more easily and cause more extensive damage. The damage done to the conjunctiva by contact with acids varies according to the degree of affinity which the latter have for water, and according to the extent of the surface of contact. When the agent is alkaline, like quicklime, the results are much more grave. Immediately after its introduction into the eye, there is seen upon the conjunctiva a thick white adherent membrane, surrounded by a chemosis. Burns of the cornea are graver than those of the conjunctiva. When only the superficial layers are injured, the scar is white and transparent, but when the whole cornea is involved, it is hard, white, and opaque. Burns of the sclerotic are usually superficial, as it is protected by the conjunctiva. As regards treatment, Weinberg advises first a careful removal from the eye of all trace of the chemical agent; and then dilution or neutralisation of the agent, cold water syringing being the best means for this purpose, except in cases of burns by quicklime, where it should never be employed. (*Rec. d' Ophthalmologie*, June, 1882.)

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⁂ Any of the foreign works may be procured on application to Messrs. DULAU, of Soho Square, W.C.; WILLIAMS and NORGATE, of Henrietta Street, Covent Garden, W.C.; or BAILLIÈRE, of King William Street, Charing Cross.

Department of Public Health.

ON THE USE AND INFLUENCE OF HOSPITALS FOR INFECTIOUS DISEASES.[1]

BY GEORGE BUCHANAN, M.D., F.R.S.

Medical Officer to the Local Government Board.

SIR,—I have the honour to lay before you, in the following pages, reports on the use and influence of hospitals for infectious diseases. They represent the outcome of prolonged and careful inquiries by Dr. Thorne and Mr. Power into the conditions of the greatest usefulness of hospitals, regarded as places for the treatment of the infected sick and as institutions for the protection of communities against the spread of infection, and they have taken account of any drawbacks to the usefulness of hospitals that might be met with in practice.

Hospitals for infectious diseases in England date from a century ago, when they began to supersede the old parish "pest-house" which had, up to that time, formed the only special provision for the treatment of the infectious sick. The original design of these hospitals was to promote the recovery of the individual poor patient for whom other accommodation was wanting; indeed the name "house of recovery" was a frequent synonym for infectious disease hospital at the period when such an institution was first seen to be necessary. But it was inevitable that the advantages to be obtained by the district possessing a hospital should soon force themselves on the attention of the observer, and from a very early period of their history, infectious disease hospitals have been advocated on the ground of their protecting the household against the spread of infection.

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[1] From the *Supplement to the Tenth Annual Report of the President of the Local Government Board.*

The benefits of these hospitals were not, however, obtained without a good deal of misfortune within the walls of the institutions themselves. In the small-pox hospital, indeed, this was not so apparent. Small-pox had from the beginning been regarded as requiring a special building to itself; it had a "specific" contagion, which could not safely be treated under the same roof with the "general" contagion of fever. So, in the hospital where no disease but small-pox was received, patients had no opportunity of contracting other diseases; the nurses, in early times selected from among those who had passed through an attack of small-pox, and in later times having their vaccination specially cared for, took nothing from their patients. But in the "fever hospital," the case was different. Doctors and nurses caught fever; in some years more than in others; while convalescent patients had what appeared to be repetitions of "fever" attacks. So serious indeed did these misadventures become, that forty years ago it had come to be spoken of as doubtful whether fever cases, if they were to be treated in hospitals at all, had not better be distributed through the wards of general hospitals. The experiment was tried, but with far greater disaster to the patients and attendants of the general hospital.

It was as this time that the medical profession was learning from bedside observation that under the name of "fever" or "continued fever" or "typhus fever," at least three different diseases had been confounded; the distinction brought with it clearer views than had before been obtainable respecting the causation of the several diseases, and most important differences were discovered in the conditions of their spread from person to person. The hopes of early sanitary reformers, that all fevers might be banished if only good drainage and pure water could be secured, had to be limited to the case of that form of fever which was distinguished as "typhoid" or "enteric." The fever for which the name "typhus" was now reserved, and the fever which had come to be known as "relapsing," were found to have their analogy with small-pox, with measles, with scarlatina, with the fevers that had been distinguished as "specific." It was soon learnt that this typhus fever and relapsing fever were not to be got rid of by improvements in drainage and water; and no preventive or palliative of the nature of vaccination existed in their case. In large towns, under conditions of crowding and filth and want, these diseases would from time to time become epidemic in the houses of the poor. And now, in the interests of the community, the need for making infectious hospital provision became freshly apparent. Removal to hospital of typhus or relapsing fever was seen to be the only available means for preventing the extension of the disease through the house and about the town. The same fact, too, had by this time come to be apprehended concerning other infectious diseases that had before been thought of as almost necessary incidents of existence, but which were found, now that statistics of death-causes were to be had, to be among the most formidable contributors to the registers of mortality; and this not only in the crowded house or in the poor quarters of a town, but almost equally so in the well-to-do family and in the country district. Especially was this the case with scarlet fever. In respect of this disease the advantage of separation of the sick from the healthy had indeed been recognised in the family, but had been but little thought about in the larger community. Not for it were the earlier "houses of recovery" devised. But as the power of hospitals to limit the spread of other infections came to be more fully seen, so with scarlet fever there appeared ground for hoping that a stop might be put to its progress in a district that made adequate provision of hospitals.

Thus the part to be played by the infectious disease hospital in the protection of the community from disease was seen to be most important; and under existing circumstances of life, especially among the poor, there was no other means of gaining this protection. Even in the case of small-pox, there remained much need for the removal of infected people to hospital.

It was not, however, till further progress had been made towards an understanding of the conditions for the greatest usefulness of an infectious disease hospital, that any extensive provision of such institutions was made. Even general hospitals were not without drawbacks to their usefulness. "If the crowding of healthy men has its dangers," says Dr. Parkes, "the bringing together within a confined area many sick persons is far more perilous." Contamination of air, impregnation of the building by morbid substances, were conditions of danger to inmates. But in the infectious hospital there were more serious risks even than these. Not only attendants on the sick, but the sick themselves were liable to contract dangerous infectious disease. These risks had to be reduced to their minimum before the full benefit of the isolation hospital to the community could be conferred.

An important step in this direction was made in 1862 at the London Fever Hospital, and the credit of it belongs to its then physician, the late Dr. Murchison. As it had been the practice since the establishment of all infectious hospitals, to treat small-pox in a separate building, and as it had become the practice to separate scarlet fever from other fevers in the wards of a fever hospital, so now a still more detailed classification was found to be needed. Typhus fever was now for the first time rigorously kept apart from other forms of continued fever; with the result that one patient only contracted typhus in the hospital for every 346 patients admitted with typhus; whereas before the separation was insisted on, persons admitted for other complaints were attacked by typhus in the proportion of one to every forty cases of typhus admitted.

Even with fair separation between the several infections there remained a risk, which if small was still appreciable, that patients in these hospitals might contract fresh disease in them, while for nurses and medical attendants there was much more serious risk. It varied, indeed, according to the sort and quantity of disease received into the hospitals; but the sort of disease to be admitted could not be determined by regulation, and the quantity of it was continually increasing as the advantages possessed by the hospital over the home were being increasingly recognised. But, what was more, instances were not wanting to show that the risk to patients and attendants varied according to the goodness or badness of the arrangements of construction and administration.

With the object of learning about the conditions for perfection in hospitals generally, a comprehensive inquiry was made for the Privy Council, twenty years ago, under the direction of their Medical Officer, by Dr. Bristowe and Mr.

Holmes. The inquiry was a fertile one, and the Report of 1863 still forms the best body of information respecting hospitals in England. Among other subjects discussed in it the best kind of provision for the hospital treatment of infectious disease was considered. The reporters, while not contending that the requirements of communities could be met by any hospital provision short of special institutions, took occasion to investigate the conditions under which it was permissible to receive particular infectious diseases into wards devoted to non-infectious disease. Studying the circumstances of cleanliness, of ventilation, of ward administration under which infected patients might be thus received, with a minimum of risk to other sick in the wards, they brought back many a lesson that could be applied in promoting the recovery of patients, in preserving them against dangers incidental to the hospital, and in reducing the very special dangers necessarily incurred by those in attendance upon the sick in infectious hospitals.

At this time, when it had come to be certain that isolation hospitals were an essential part of the defences of a district against disease, and when the conditions for their usefulness had been to a considerable extent defined, the Sanitary Act of 1866 conferred upon local authorities the power of erecting and maintaining such hospitals. This power was given afresh to urban and to rural sanitary authorities alike by the Public Health Act of 1875.

Your Board, acting on the advice of its medical department, has lost no opportunity of pressing on local sanitary authorities the importance of making use of these powers. In 1871 a memorandum on hospital accommodation was prepared for the assistance of those who had occasion to make the provision for the isolation in hospital of infected persons who could not be retained in their own homes without danger to others, and this memorandum has since been in constant use. In view of the experiences gathered by medical inspectors of the disaster resulting, in the absence of public provision for the isolation of infectious disease, to district after district into which fever, small-pox, or scarlatina, had chanced to be introduced, the Board had urged upon local authorities the necessity of having some isolation accommodation ready at all times in anticipation of the first appearance of infectious disease, and has endeavoured to show the means by which this could best be provided for the large and the small community respectively. Sanction to the borrowing of money for the erection of isolation hospitals has been freely given, and the services of the architectural and medical departments have ever been placed at the disposal of authorities desirous of carrying out this important branch of their sanitary duties.

The efforts of your Board with this object have been fairly successful. From a return made to the Board in 1879 of sanitary districts that had provided themselves with means of isolation for infectious disease, it appeared that 296 authorities had arrangements of one sort or another, in hospitals of their own or by an understanding with their neighbours, for the reception of infected persons who could not be treated at their own homes with safety to other people. The arrangements were indeed often of a rudimentary and insufficient character; but some authorities had liberally and wisely used their powers, and had provided excellent fever and small-pox hospitals.

In view of this return and from other considerations that forced themselves on the observation of the Board it became evident that authorities who might be wishful to provide hospitals were frequently finding themselves hindered by lack of experience, by apprehension of difficulty, and by the real difficulty arising from the objection of landowners to sell land for the purposes of an infectious hospital, and from the objection of householders to have an infectious hospital for their neighbour. It was presently seen that the Board could usefully collate for the assistance of such sanitary authorities the experiences of other authorities who had, under comparable circumstances, provided their districts with hospitals. Moreover it had become essential to learn whether or not there was ground for the fears of landowners and neighbours, and what were the conditions for removing or reducing any real danger that might be found to exist. This knowledge was wanted indeed for the Board's own purposes, since it had become the Board's custom before acceding to proposals of local sanitary authorities to borrow money for hospital construction to satisfy itself that the proposals were such as to afford the greatest attainable advantage to the locality.

To an inquiry with the objects here indicated Dr. Thorne has devoted many months of the years 1880-81; and his report occupies the greater part of the present volume. He has inspected about seventy hospitals in use by urban, by rural, and by port sanitary authorities; of every variety of locality, size, and construction; some thoughtfully devised on a scale adapted to the needs of their districts, and reckoned by those who had provided them as among the most valuable sanitary defences of those districts; others ill-placed, or on an altogether insufficient scale or badly planned, doing duty in default of better, though of flimsy material and hurried construction. And in administration the hospitals have varied from such as were freely opened to all who would in the interests of the community and themselves put the hospitals to their designed use, and such as were provided with arrangements, accommodations, and appliances fitting them for that use, to others that made the payment of large sums the condition of admission to them, and others that were wanting in one or many of the commonest essentials of hospital efficiency.

As respects the advantages which Dr. Thorne has been able to demonstrate as accruing to a district from the provision of an infectious disease hospital in it, it is found that, with few exceptions, the hospitals have been used for the isolation of infected people who, in the absence of the hospital, could not have been isolated at all, but must have spread disease to their neighbours. And their use has not been by any means restricted to persons so lodged that their removal to hospital might be effected by compulsion. There are districts where the well-to-do artisan and shopkeeper and people of ranks of life esteemed even higher than these, have been glad to profit by the advantages of the hospital, and have had their confidence justified by their own more assured recovery as well as by the satisfaction of having secured their housemates from disease and death.

And the further gratifying fact appears from Dr. Thorne's report that, where any reasonable accommodation has been provided there has been an increasing disposition on the part of the neighbouring population to make use of it, and even to allow their little ones to be put under the care of strangers in the hospital. Young children of ten years and under have ranged in various towns between 33 and 81 per cent. of the whole number received. The proportion of adults in the hospital was, as might be supposed, larger when small-pox or "fever" has been the prevailing disease; the proportion of young children larger when the hospital was chiefly used for scarlatina. Nowadays, in the case of scarlatina, it would seem that the percentage contributed in some districts by children out of the total admissions is very closely the same as the percentage borne by children out of the total attacks of scarlatina in England. This fact alone may be taken as sufficient evidence of growing public confidence in these hospitals regarded as places for the recovery of the sick.

The report draws a strong distinction between the utility of hospitals that had been deliberately prepared and kept in readiness against the time when infectious disease might appear in the district, and of those others that had been provided when an epidemic prevalence of disease was seen to be commencing. In the case of the former, the isolation of the sick person effected by the hospital had repeatedly appeared to mean the prevention of an epidemic in the locality. "I could occupy you for hours," says Dr. Thorne, of the evidence he has collected, "in telling you instances in which epidemics have evidently been prevented by the isolation of first cases of infectious disease." But of the hospital hastily run up when small-pox or fever is making head in the district, the report has little good to say. "It is often not ready for occupation," he writes, "until the immediate cause of its erection has passed by; it provides accommodation of a very indifferent sort; it fails, almost without exception, to meet the permanent requirements of the district, even when in amount it turns out to be more than the district needs; and thus the object of the hospital, as a part of the sanitary defences of the district, is often attained in a very imperfect manner and at a needlessly large cost." Dr. Thorne's observations, in this particular, strengthen the grounds of the advice which the Board ever gives to local authorities, that it is a condition of the highest degree of importance for the usefulness of these institutions that their accommodation shall be ready beforehand.

The general belief of districts where isolation hospitals have been erected that epidemics have repeatedly been prevented by their means, and the multiplied instances of danger proved to have been averted from the units of the community—of disease prevented in the household, in the school, and in the factory—must be taken for the present, in the absence of adequate statistical evidence, as proving the total advantage of the hospitals to the entire community. Dr. Thorne does indeed adduce certain statistics that have been presented to him as evidence of the efficacy of hospitals, where extensively used, to diminish the prevalence and mortality of infectious disease in one and another district. But longer experience than any now available is wanted before the value of the hospital to the community can be proved by statistics.

Whether or not any injurious effect upon the health of a population could be traced to the presence of a hospital in its midst was the further problem which Dr. Thorne's inquiry was directed to solve, and his results are chiefly negative. He has in several cases found infection communicated through some fault of administration, fault of a sort that should not have existed at a hospital, but which would have been simply inevitable if the sick had been under private management. Further, he has in the case of small-pox recorded two instances where infection had appeared to spread from a hospital in a row of houses to other houses, in a way that suggested conveyance of the infective matter through the atmosphere rather than by means of persons or things. In many other instances the same disease, small-pox, being in question, Dr. Thorne heard of no extension of infection to neighbouring streets and houses, in spite of the best inquiries that he and officers of health before him could make. This is all: for the rest, Dr. Thorne, having to tell many a story of hospitals in which the circumstances of site, of construction, and of management might have been better than they were, has nothing to record of fevers, scarlet, typhus, enteric, or other infectious diseases spread from the hospital, as such, to its neighbourhood.

The very experience that has led to the present practices of disease-classification within fever hospitals and that has required small-pox to be treated in distinct buildings, is consistent with an *a priori* expectation that on careful inquiry it might be possible to discover round ill-placed hospitals instances of the spread of disease, especially of small-pox; for it could not be affirmed that on passing the doors or windows of the hospital the air-borne material of infection became inert. At a former time, indeed, it was thought that the infection must needs be destroyed by dilution; but with better knowledge of the pathology of infection and with recognition of the material of infection in its near relations with particulate matter, this expectation had to be modified. It came to be seen that dispersion of infection was not necessarily synonymous with destruction of it, and with the new knowledge it was felt that fresh assurances respecting its destruction would have to be gained. Wherefore it is assuredly satisfactory to note how few instances of an infection, seeming to have been conveyed through the air, were discoverable in Dr. Thorne's prolonged inquiry.

It is not necessary for me to refer at length to the lesson taught by Dr. Thorne's experiences of disease occasionally distributed from hospitals that are carelessly administered. Occurrences such as these ought not to be witnessed in hospital practice. They are the accidents, I repeat, inevitable in the infected home of the patient, but for the avoidance of which the hospital is directly intended. But the reported occurrences give occasion to insisting that hospitals for infectious disease should, without exception, be under direction of a skilled sanitary officer who should be responsible for care in every sanitary detail, and whose duty it should be to inform himself not only of the wholesomeness of the hospital, but of the health of its neighbourhood, to investigate the facts as to any apparent spread of disease from the hospital, and the means by which any actual spread may have taken place. Without such an officer apprehensions to the discredit of the hospital will be sure to arise, and importance will infallibly attach to the most frivolous equally with the most real of them.

Dr. Thorne has prefaced his report upon the hospitals of particular districts by a comprehensive report on the various subjects requiring attention in the provision of infectious hospitals generally; on questions of site and construction, of cost, of warming and ventilation, of classification and administration. He distinguishes between efficient and inefficient hospitals, and considers the reasons of success or failure in the attainment of results. He gives experiences about drainage and water supply; about ambulances, disinfecting chambers and mortuaries. In his account of particular institutions he has inserted a number of useful plans and drawings. The whole forms a mass of instructive matter for the assistance of sanitary authorities and their advisers, and it will facilitate, I trust, their operations for securing for their districts the very great advantage of public means of isolation.

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